

THE CARIBBEAN
ITS PRESENT PROBLEMS

edited by
A. CURTIS WILGUS



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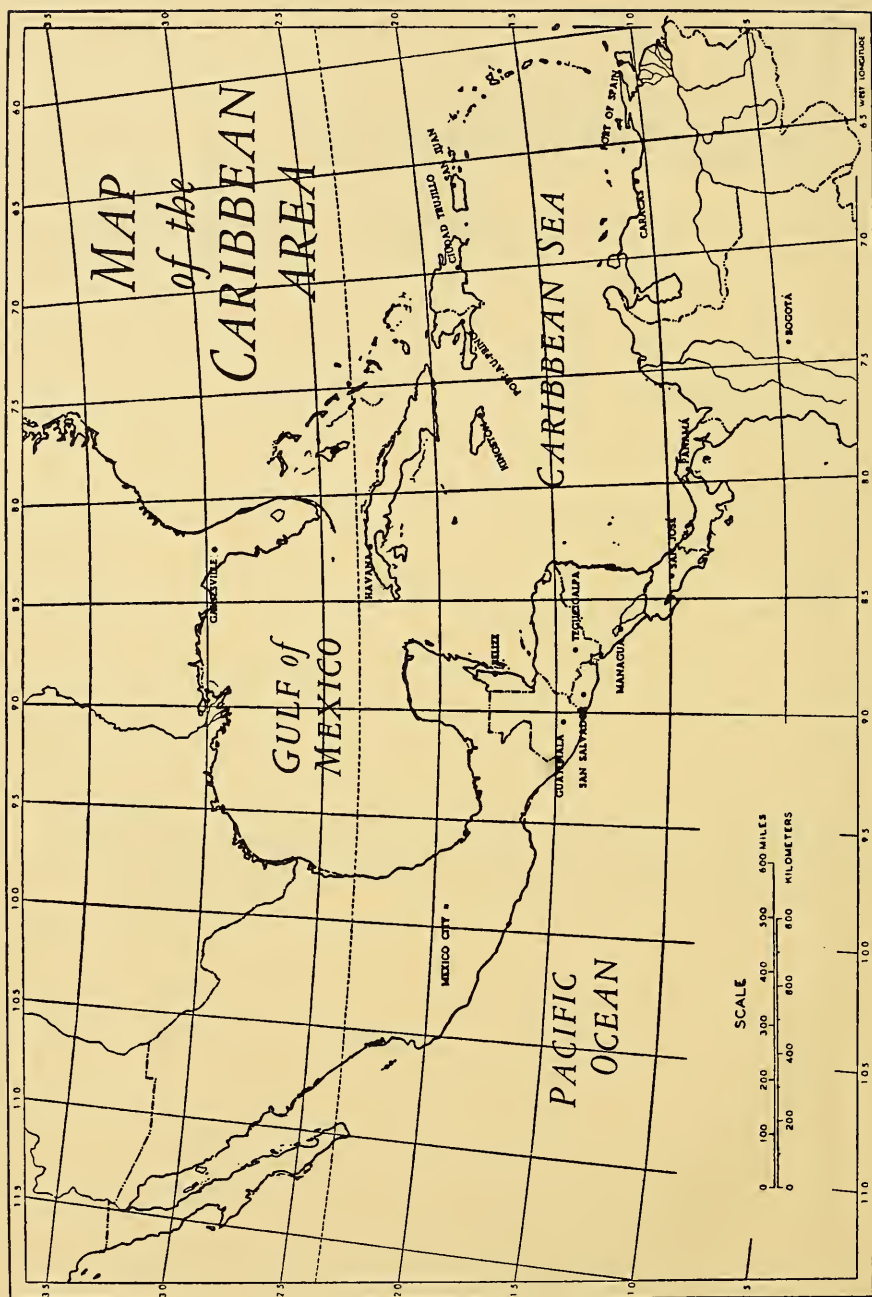


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Conference on the Caribbean University
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Papers

The

CARIBBEAN:

ITS HEALTH PROBLEMS

edited by A. Curtis Wilgus



1965

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Foreword

OVER THE PAST fourteen years, the University of Florida's Annual Caribbean Conference has been devoted primarily to the political, social, economic, cultural, and educational aspects of the contemporary Caribbean. In view of the nature and the magnitude of health and sanitation problems in the Caribbean, it seemed appropriate this year for the Center for Latin American Studies and the J. Hillis Miller Health Center to organize jointly the Fifteenth Conference with health as its central theme.

This decision proved to be a fruitful one. Dr. Samuel Martin, Provost of the Health Center, and Dr. A. Curtis Wilgus, Director, Caribbean Conferences, procured the services of a most distinguished group of experts from the United States and the Caribbean as speakers and participants. As a consequence, the papers and addresses presented were not only of outstanding individual quality, but, together, constitute a comprehensive and well-integrated view of problems and accomplishments in the field of health in the Caribbean area.

I should like to express my deep appreciation to all the persons on the faculty and staff of the University who worked so effectively to make the meeting a success and to Smith, Kline and French Laboratories of Philadelphia who, as co-sponsors, provided invaluable assistance.

As in past years, the University of Florida Press has published the proceedings of the conference in a most attractive format. I am sure that the present volume will be a valuable reference work not only to health experts but also to all serious students of the Caribbean region.

J. WAYNE REITZ, *President*
University of Florida

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Introduction

THE FOUNDING OF THE SCHOOL OF TROPICAL MEDICINE OF THE UNIVERSITY OF PUERTO RICO

THIS FIFTEENTH ANNUAL CARIBBEAN CONFERENCE deals with health problems in the Caribbean. Everyone, to some degree, is interested in health problems, especially his own, although somehow problems of health in remote areas of the world seem to be less important and perhaps even less serious than those nearby. But the Caribbean is at our front door, and all aspects of health in that area should be of interest to people in the United States. As a matter of fact, the United States has concerned itself for decades with helping to solve health problems in the Caribbean. Especially has the United States been concerned with problems in the area since the Spanish-American War in 1898. With the acquisition of Puerto Rico, the forcing of the Platt Amendment upon Cuba, and the purchase of the Virgin Islands, we have become actively concerned with improving standards of living, concentrating largely upon problems of health. Therefore, a conference of this nature attracted wide attention, and a number of experts from the Caribbean and from the United States with specialized and extensive experience assembled to discuss this significant topic. In previous Caribbean Conferences, questions of health and related topics have been discussed, but no conference until this one was devoted entirely to the subject. It is hoped that this volume may serve as a reference, not only for experts, but also for the general public who wish to learn more about the Caribbean area and who, incidentally, may wish to travel in that area and perhaps even retire there someday.

I

The successful practice of medicine in the Caribbean was advanced immeasurably by the School of Tropical Medicine of the University of Puerto Rico. It therefore seems relevant to the general theme of this Conference to describe briefly the founding of this remarkable institution as an introduction to the general subject of "Health Problems" in the area.

Some thirty-five years ago, on my first visit to Puerto Rico, I had the good fortune to walk by the School of Tropical Medicine of the University of Puerto Rico and the good sense to go in and visit it. The School had been opened in September, 1926, and although there were schools of tropical medicine in England, France, Germany, and the United States, this was the first one to be established in the tropics where conditions could be studied firsthand in their environment.

The School stems from the former Institute of Tropical Medicine and Hygiene organized in 1912 in Puerto Rico. In 1923 the President of the Senate of Puerto Rico, Antonio R. Barceló, became personally interested in the establishment of a School of Tropical Medicine and he proposed to the Corporation of Columbia University in New York City that it join with the University of Puerto Rico in founding a School of Tropical Medicine. This, however, was not the first suggestion to form such a school. Mr. Barceló consulted Dr. A. L. Goodman and Dr. J. Antonio López Antongiorgi, and plans were formulated whereby mutual cooperation between Columbia University and the University of Puerto Rico could be worked out. The plan which they drew up was presented to and endorsed by Horace Mann Towner, Governor of Puerto Rico. It was then presented to the Legislature.

This body moved rather rapidly and the next year, in 1924, a joint resolution was agreed upon creating a School of Tropical Medicine of the University of Puerto Rico under the auspices of Columbia University, and the sum of \$100,000 was provided through the Building Fund of the University for the construction of a building containing offices and laboratories. At the same time this resolution provided that the old Institute of Tropical Medicine and Hygiene should cease to exist and that its property should be transferred to the new school.

The next year, in July, 1925, another act of the Legislative Assembly, with the Governor's approval, authorized a reorganization of the University of Puerto Rico and provided for a special Board of Trustees for the School of Tropical Medicine which would succeed the temporary provisional board.

In May, 1926, the building for the School was completed and the equipment from the old Institute was transferred to the new School.

II

The new School opened its first term October 1, 1926. An announcement stated that its primary aim was "to give the opportunity for the study in a tropical environment of that large, ill-defined group of disorders known as tropical diseases, and at the same time to observe the influence of exotic conditions on diseases in general."

The first official course announcement was as follows:

SCHOOL OF TROPICAL MEDICINE OF THE UNIVERSITY OF PORTO RICO

Under the Auspices of Columbia University
San Juan, Porto Rico

REGULAR TERM COURSES beginning October 1, and February 1, each lasting sixteen weeks, are given in tropical pathology, bacteriology, parasitology, chemistry, clinical medicine, public health and communicable diseases.

A certificate in Tropical Medicine is granted upon the completion of an approved program of study.

A SHORT INTENSIVE COURSE planned especially for physicians and health officers is offered January 10 to February 1. In this course the commoner diseases of the American tropics will be considered in their pathological, clinical, and public health aspects. Correlation of laboratory, clinical, and field studies is made possible by a close affiliation of the School with the Insular Department of Health.

In both the regular and the short courses the number of students is limited. A medical degree or equivalent preparation, is a prerequisite in all cases.

Opportunities for research in laboratory and field are open to qualified investigators during the entire year.

For further information, apply to

DIRECTOR,
School of Tropical Medicine,
San Juan, Porto Rico

The first laboratories were established for the study of bacteriology, chemistry, mycology, pathology, and parasitology, each of which was to accommodate fifteen students and investigators. An excellent library, open to students and investigators alike, was on the second floor of the building. Seventy-five journals covering various branches of tropical

medicine and related fields were received as well as a number of public health reports. At least 500 volumes of textbooks and reference works were at the disposal of students. Thus a rare opportunity was provided to qualified investigators wishing to pursue independent research or to collaborate with local staff on problems of mutual interest. Materials needed by these research workers were to be provided at cost. Field work could be carried out in any part of the island through the cooperation of the Department of Health, and classes from the School were to spend one to three weeks in Puerto Rican districts where intensive campaigns against diseases were organized. One attack made was upon malaria, which was a very serious problem throughout the Caribbean.

Adequate clinical facilities were arranged through the courtesy of various public and private hospitals in the island. During the first year, clinical instruction was given in the Quarantine Hospital for Transmissible Diseases, the Leper Hospital, the Presbyterian Hospital, the Municipal Hospital of San Juan, and the Anti-Tuberculosis Sanitarium. Plans for a small hospital of forty beds and a dispensary to be directed by the Insular Government were proposed for the School. This hospital was to be operated by the Department of Health in close cooperation with the School, providing special facilities for teaching and investigation.

From the inception of the School, courses of study offered a wide scope and included several principal subjects: bacteriology, mycology, pathology, chemistry, medical zoology, public health and transmissible diseases, tropical medicine, and surgery. There were nine professors on the faculty, fourteen instructors, six resident lecturers, four visiting lecturers, and two consultants. Colonel Bailey K. Ashford, connected with the former Institute of Tropical Medicine and Hygiene, agreed to collaborate in the work of the School. The first administrative officers were Dr. Thomas E. Benner, Chancellor of the University of Puerto Rico, Dr. Nicholas Murray Butler, President of Columbia University, and Dr. Robert A. Lambert, Director of the School of Tropical Medicine.

III

Although the first courses at the School did not begin until October 1, the School was inaugurated on September 22. At that time a number of addresses were delivered, among them being that of Dr. William Darrach, Dean of the College of Physicians and Surgeons, Columbia University. Some excerpts from his address will prove interesting.

"The School of Tropical Medicine is essentially a place for study, and so there have already been assembled a staff of men who are essentially

students—twenty-eight in all, twenty-five from Puerto Rico and three from the United States; men whose interests and desires are not only to teach what is known today of this field but to continue their studies in order to ever broaden and deepen the knowledge of these conditions. This spirit of research, this desire for the truth is the great overwhelming essential quality for the staff of a modern school. A great deal already has been learned concerning the symptoms and course of tropical diseases: much has been brought to light as to the causes of these conditions and how to cure and prevent them. Yet we feel that a far greater amount remains yet to be done in alleviating the suffering, lengthening the life and increasing the producing powers of the people in the tropics.

“Among the reasons for the establishment of such a School in tropical America are, first, the wealth of opportunity for study. Not only is there a wide variety of pathological conditions for investigation and for teaching material, but the fact that through the efforts of the Department of Health and the medical men of Puerto Rico, great strides have been made in the control, cure and prevention of these conditions. It is well for a student to see not only the dark side of these conditions, their distressing effect on mankind, but also to see the brighter side and what is already being done to combat them.

“Secondly, it must be confessed that the doctor who graduates from a medical school in the states has learned but little of the conditions as they occur in the tropics. It is necessary, therefore, for one who is to practice in the tropics to take a postgraduate course in such subjects. To meet this need a definite comprehensive course has been planned out so that such men can, within one academic year, become familiar with the essentials of tropical disease.

“A third reason is that most of the schools of tropical medicine throughout the world are situated in northern climates. Some of the men who have done the most to broaden our knowledge of these conditions have had to do their work away from the tropics. It is hoped that many such advanced workers will be tempted to come to Puerto Rico to continue their studies under such ideal conditions.

“What share has Columbia University in this project?

“At the invitation of your representatives, Columbia has been asked to assume a definite responsibility. It was felt that because of its experience in similar undertakings, and perhaps its prestige, it could be of service in guiding the educational work in the selection of the scientific personnel and in criticizing the projects of the laboratories. This responsibility the University has willingly accepted and will sincerely carry out to the best of its ability. . . .

"The financial contribution that Columbia is now making is pitifully small. No one realizes that as much as we ourselves do. But this does not mean that it will remain so. We have every intention and every expectation of increasing the contribution as times goes on and we are able to interest people with money to spend it in that way."

IV

In May, 1927, the Director of the School of Tropical Medicine, Dr. Robert A. Lambert, sent a special report to the Board of Trustees of the School summarizing briefly the activities during its first year. The following is an excerpt of this report with some significant quotations.

During the first year 14 courses were offered in the following subjects: pathology—2 courses; chemistry—2 courses; bacteriology and mycology, immunology, clinical pathology—2 courses; public health administration—2 courses; parasitology, transmissible diseases, malaria, rural sanitation, public health engineering, and bedside instruction. In addition there were given weekly clinics on Saturday mornings and scientific meetings or seminars, on Thursday evenings, to both of which the medical public was invited without registration or other formality.

Twenty-nine students, a number considerably larger than had been expected, registered during the first year. Twenty-three had the degree of Medical Doctor; the remaining six, had degrees or certificates indicating adequate preparation for the courses taken. No undergraduate instruction was offered. Most of the students, as anticipated, were Puerto Rican physicians who took this opportunity for graduate study.

Fifteen public lectures were given during the year on subjects of general interest, seven by resident lecturers and eight by visiting scientists. "Probably never before has Puerto Rico had the opportunity of seeing and hearing so many distinguished scientific visitors at a single season." Wide interest was shown in these lectures and on one occasion the auditorium, which seated 60 people, was filled to overflowing by 120.

It was decided at the beginning that the School should not make routine tests but physicians were invited to send for examination "patients suffering from diseases of special interest, and those of possible value in research. Furthermore, we offered to examine histologically, autopsy and surgical specimens, such a service not being provided by the Department of Health or by any other agency on the island. This offer met with the prompt response from the physicians of Puerto Rico and has increased to such an extent that our space and budget are being taxed to maintain it. Fifty-five autopsies have been performed, some of

them in towns some distance from San Juan, and over 70 surgical specimens have been sent to the school for examination by seventy-six physicians representing seventeen municipalities." No charge was made to either patient or physician for any examination.

Teaching the first year was on a bilingual basis. "While it is generally not practicable to give the same courses in two languages at the same time, it has been found feasible to give the same course alternately in English and in Spanish, thus meeting the needs of students who speak only one language." During the year six public lectures were given in Spanish and nine in English. A majority of the Saturday clinics were given in Spanish while a majority of the seminars were given in English. The School offered an exceptional opportunity to students who knew a second language slightly to increase their proficiency in it.

Because of the complete cooperation of the Department of Health, there was no lack of interesting cases for the School's clinics, and frequent demonstrations were held. "On the other hand the hospitals here, as in other medical centers, have recognized that cooperation with the teaching institution is of mutual benefit. Though the special hospital will solve our greatest need, we shall expect not only to continue but to broaden the School's affiliations with other hospitals, both in San Juan and other cities of the island.

"The School has two functions: teaching and research. While the value to Puerto Rico of the teaching function will be the more quickly seen, the results being indeed already evident, it will be the research done here that will eventually show not only the largest results locally, but that will carry the name of the School all over the world. I do not expect that any great number of students will ever come here for study. Specialized graduate schools never attract large numbers, but thousands of physicians and scientists working in other tropical fields will read our publications and profit by the results of investigations made here.

"The energy of our staff this first year has been largely consumed in details of organization, collection of material for teaching, classes, etc. But already several papers have been finished and various others will be completed during the summer when there will be less teaching and consequently more time for research.

"Research requires not only laboratory equipment, but most important of all, trained men with time for work and contemplation. Very little by way of investigation can be expected from busy clinicians or public health workers, whose time is generally filled with routine duties. The School will need a large number of trained workers with time free for investigations. . . .

"The most important topic has been left to the last. Since a full financial statement cannot be made before the end of the year, I wish at this time only to point out some pertinent facts. The budget for 1926-27, approved by you on June 23, 1926, amounted to \$43,480 exclusive of Columbia's contribution for the Director's salary. Since the university allotment to the School was only \$30,500, there was an anticipated deficit of \$12,980 (the income from tuition fees has been estimated at \$1,500).

"On November 1, 1926, Columbia assumed for the current year the salaries of two other professors who had come from the mainland, contributing \$5,000 to this end. This addition to our assets, together with several economies made possible by private donations, have reduced the deficit to about \$5,000.

"In addition to Columbia's own contribution, there have been received through the Columbia affiliation, donations in material and in money for specific expenditures by the Director, amounting to more than \$3,000. To Columbia's credit may be added also, the services of two of her professors, Dr. McKinley and Dr. Phelps, who each spent several weeks here in giving lectures and in organizing of our departments.

"It is clear therefore that while the greatest value of Columbia's affiliation comes from counsel, guidance and prestige, the material assistance rendered amounting directly or indirectly to nearly \$20,000 during this first year, is of the greatest importance."

In conclusion, Dr. Lambert said, "This brief survey of the School's activities in its first year, I trust will give you some idea of the excellent beginning that has been made. Toward this result the splendid work of the faculty, the valuable assistance of the Department of Health, the cooperation of the medical profession, the interest of the public, have all contributed."

V

The October, 1928, issue of the *Porto Rico Review of Public Health and Tropical Medicine* contained in its brief news notes the announcement that Dr. Robert A. Lambert, who had been Director of the School of Tropical Medicine for the last two-and-one-half years, was resigning to accept a position with the Rockefeller Foundation in New York as Associate Director of the Division of Medical Education. On this occasion the staff of the School and the medical profession at large throughout the Island expressed their appreciation of the splendid constructive services which Dr. Lambert had rendered the School and to the medical

profession during his regime. He had demonstrated a rare combination of high executive ability as well as an exceptional professional attainment. "His sympathetic understanding of the medical and social problems of the Island has in many instances been a subject of general comment."

Dr. Lambert made another contribution in editing the above-named review, which received wide praise everywhere.

As a token of their appreciation and esteem, the faculty of the School presented Dr. Lambert with a certificate signed by the faculty members and with a beautiful gold watch on the back of which was engraved the seal of Puerto Rico. The announcement concluded: "With him go the best wishes of his many friends here for continued success and opportunity for service in this new field of activity."

The successor to Dr. Lambert was Dr. Earl D. McKinley, born in Kansas in 1894, who assumed office in September, 1928. Dr. McKinley remained as Director of the School until he resigned in September, 1931, to accept the headship of the Medical School at The George Washington University in Washington, D.C. It was here at this institution that I first came to know Dr. McKinley as a friend and a colleague.

The School was again in excellent hands, for Dr. McKinley had had a most interesting background. He had served as instructor in bacteriology and physiological chemistry at the University of Michigan Medical School, 1919-22; as assistant professor of pathology, bacteriology, and hygiene at Baylor University, 1922-23; as professor of bacteriology and hygiene and chairman of the department at Baylor University College of Medicine, 1923-24; as Fellow National Research Council, Bordet's Laboratory of the Pasteur Institute, University of Brussels, 1924-25; as assistant professor of bacteriology in the College of Physicians and Surgeons of Columbia University, 1925-26; as associate professor of bacteriology in the College of Physicians and Surgeons of Columbia University, 1926-27; and as state director, International Health Division, Rockefeller Foundation, stationed at the Bureau of Sciences in Manila, Philippine Islands, 1926-28. At the same time he had served as professional lecturer in the School of Hygiene and Public Health in the University of the Philippines. It was from these two latter positions that Dr. McKinley came to assume the directorship of the School of Tropical Medicine at the University of Puerto Rico.

Under such admirable directorship the School was bound to prosper and to develop a much wider field of activity and influence. However, we are concerned here only with the establishment of the School, and while Dr. McKinley's activities are most interesting, an account of his

regime in San Juan must be left to others. At The George Washington University, Dr. McKinley maintained his contacts with the Philippine Islands and it was on a flight over the Pacific, July 28, 1938, that his plane disappeared without a trace.

In concluding, one significant date should be mentioned. In June, 1948, Columbia University withdrew its sponsorship of the School and it then became much more closely attached to the School of Medicine of the University of Puerto Rico as an autonomous unit of that university.

A. CURTIS WILGUS, *Director*
Caribbean Conferences

Bibliographical note: The above account is based on personal knowledge, correspondence, and the following publications:

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The American Journal of Tropical Medicine, XIX (1939), 97-101.

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Part I

PHYSICAL AND CULTURAL
ENVIRONMENT

Herbert C. S. Thom : SOME ASPECTS OF THE CARIBBEAN AREA CLIMATE

I. Introduction

CLIMATE is the statistical population of weather events. It is described by statistics estimated from sample series of meteorological data constituting the observational records of weather conditions from individual meteorological stations or networks of such stations. Although meteorological observations are the most satisfactory means of describing climate, other means may be employed either as aids to the meteorological description or as independent parameters. The most common aid is the landscape. Since the pedology and geomorphology of an area are partially related and the botanical development almost entirely related to climate, the landscape has been used extensively as a depiction of climate as an aid to meteorological data as well as independently. There are other factors which are determined by climate and therefore are also indicators of climate. The medical geography of a region may be an indication of climate; although here one must be careful that the factor depicted is causally related to weather conditions. Many have been misled in this area by apparent relations which are nothing more than geographical coincidences or related only by reason of a relation to a common factor. For example, the Caribbean area has a tropical climate and also a high mortality from a number of diseases. Only a part of this can be laid to climate, for if the economic level of the population is raised, this mortality will immediately go down. Climate to a great extent is only as much of a determiner of economic level as man wishes it to be.

It cannot be emphasized too strongly that outdoor climate cannot be

changed. Under certain special conditions local weather conditions might be modified, but the possibility of modifying climate is extremely remote and should not be thought of as a potential solution to climatically related problems. Indoor climate and environment can, of course, be modified. Climate must be thought of generally as having both resource factors and liability factors. Man is at his best when he takes full advantage of its resources and ameliorates as many of its liabilities as he can.

In keeping with the theme of this Conference emphasis will be given to climatic factors related to comfort or well-being. These are temperature, humidity, wind, and solar radiation.

II. Temperature

The most general description of the climate often given to the Caribbean area is that it is tropical. This implies broadly that the temperature is warm and varies little throughout the year. Part of the seasonal stability is due to the latitude position but a part is also due to the Caribbean Sea. It has been said that the temperature of the islands and of the coastal areas is that of the Sea. This, of course, is a generalization.

Mean monthly temperature near sea level is generally in the 70's during November through March or April and in the 80's from April through October. In more tropical areas in the western parts of the area, the temperature averages in the 80's over the entire year. Average maximum temperatures are generally in the middle or high 80's in summer and in the high 70's or low 80's in winter. Average minimum temperatures are generally in the low to middle 70's in summer and mostly in the 60's in winter. Extreme temperatures above the 90's and below the 70's are not frequent.

The Caribbean land area is one of widely varied topography. Elevation above sea level, of course, greatly reduces temperature. A reduction of 1°F for each 300-foot increase in elevation appears to be a good average for the area.

III. Humidity

Relative humidity is remarkably constant through the year at most locations varying only a small per cent partly in relation to the precipitation. Precipitation, however, is much more variable both between seasons and over the area due to variation in elevation and exposure. Relative humidity appears to be controlled largely by the temperature

of the Caribbean Sea and the annual variation in temperature, the two varying together in such a way as to result in little seasonal variation in relative humidity.

Mean relative humidity over the area varies from 65 to 80 per cent with most stations having values between 70 and 80 per cent with 70 per cent being a fairly representative value during the warm hours. Both vapor pressure and saturated vapor pressure (temperature) decrease with elevation at rates which leave the relative humidity constant or cause it to increase slightly with height. When the skies are mostly clear the relative humidity will rise about 10 per cent above the daily average during the cool hours of the night and fall 10 per cent below the daily average during the warm hours of the afternoon.

IV. Wind

The circulation over the Caribbean area is controlled almost entirely by the very persistent northeast trade winds. Thus at most locations the wind is preponderantly in the easterly quadrants with a substantial percentage from the northeast and east. Mean wind speeds vary from 7 to 12 miles per hour (700-1,000 feet per minute). Speeds are higher during the warmest hours of the day averaging from 12 to 15 miles per hour (1,000-1,300 feet per minute).

During the night they average 5 to 10 miles per hour (400-900 feet per minute). The percentage of winds less than 3 miles per hour (calm, 260 feet per minute) is small during the warmest hours of the day. Wind conditions can, of course, vary widely according to exposure but the Caribbean area is generally a breezy region at all times. During the warm hours the sea breeze reinforces the prevailing wind in windward exposures and, of course, does the reverse in leeward exposures.

V. Radiation

There is not a great deal of radiation data available in the Caribbean area, but short periods of observation at San Juan and Swan Island give an indication of general conditions. Mean daily radiation varies from 400 to 650 langleys, with the months from February through September having above 500 and the months from March through August generally above 600 langleys.

Percentage of possible sunshine varies generally from 60 to 80 per cent with the values in the 60's from May through September.

VI. Climate and People

Panama has as tropical a climate as any area in the Caribbean. Kew-drew in his *Climates of the Continents* says: "The Canal Zone had an extremely bad medical reputation in former times, which seems to have been justified by the high disease and mortality rates during the early attempts to dig a canal. But rigorous and extensive application of sanitary, especially anti-mosquito, measures by the American engineers of the present canal worked a wonderful improvement, and the zone is now notably healthy, and even pleasant in winter for a region so near the equator." This is only one piece of evidence supporting the proposition that climates are not unhealthy and that only environments which may be changed are unhealthy. To be sure, some climates may be unhealthy for unhealthy people, but for the healthy person in a healthy environment climate only affects his comfort.

Certainly there are important problems of climate in respect to the unhealthy. These are problems for the physician. When he can specify the climate required for a particular state of ill-health, and progress has already been made in some areas, the optimum climate could be established artificially indoors, the patient could seek a prescribed climate, or he might be taught to minimize the bad effects of the climate in which he resides. We shall concern ourselves only with the normally healthy who are subject to the ordinary climatic conditions of the area.

VII. Climate and Comfort

Studies of comfort in relation to measurements of the condition of the air have been made. Some have taken the comfort approach; i.e., experiments are run under different conditions and the subjects are asked to register their feelings of comfort or discomfort. Others have taken the physiological approach where comfort is evaluated by measurements on the human body and little attention is paid to the feelings of the subject. Most studies seem to give roughly comparable results at the more extreme conditions of discomfort and have their greatest disagreement at the more moderate conditions where physiological measurements are not as sensitive and it is difficult for subjects to express their state of comfort. A great deal, of course, depends on the state of activity of the subjects, and this has also led to varying results.

Recent studies for persons at rest seem to show that at moderately uncomfortable conditions the dry bulb temperature is a more important component and the humidity a less important component of comfort

than was originally thought. This has been amply demonstrated in southern Florida which in recent years has become as important a summer resort as it has long been a winter resort. To be sure, structures there are now commonly air-conditioned, but this only modifies the indoor climate which is almost always much worse than the outdoor climate, especially in the poorly designed structure. The answer appears to be that southern Florida, which has a climate like much of the Caribbean, has a limit placed on the dry bulb temperature by the humidity and has good winds with steady speed which exert a favorable effect on the outdoor comfort especially of people who are engaging in vacation activities.

Although the effective temperature is not a completely satisfactory parameter of comfort at fairly high temperatures and humidities, it gives a fairly good indication of comfort especially when including the effect of wind speed. At a commonly encountered condition of 70 per cent relative humidity and 85°F with no wind speed, the effective temperature would be about 80° which would make people who are normally clothed and at rest outdoors in the shade somewhat uncomfortable. Increasing the wind speed to 9 miles per hour, a common value in the Caribbean area, would decrease the effective temperature to about 75°, a quite comfortable value. On the beach with 90° and 75 per cent relative humidity a person dressed in a swim suit sitting in the shade with the same breeze would not feel uncomfortable. It is seen that the steady winds of the Caribbean area play a strong role in outdoor comfort.

Indoors the situation is ordinarily quite different; here radiation tends to play a strong role and ventilation air speeds tend to be much lower than outdoors. Here, therefore, every effort must be made to protect against radiation which can greatly increase the dry bulb temperature effect and to insure that maximum advantage is taken of natural ventilation. Radiation, however, is the factor which seems to have the greatest susceptibility to control and its control ensures comfort more than any other component of the climate.

Air conditioning is, of course, the ultimate answer to indoor comfort. There is hardly a place in the populated world where air conditioning is not desirable, mainly because of the important effect of radiation on indoor temperature. How widespread air conditioning becomes will depend on economics and on provision of power and other means.

VIII. Climate and Work

For people doing office work the conditions for comfort are roughly the same as for people at rest; i.e., an effective temperature 75° or less

is desirable. In uncomfortable conditions mental work becomes difficult and, although little conclusive evidence on the effect of increased comfort on efficiency is available, marked improvements have been noted. Most companies feel that to air condition or to increase comfort is good policy.

When man is doing physical work a measure of efficiency is more readily available. At the American Society of Heating and Refrigerating Engineers Research Laboratory it was found that men doing physical labor at 90,000 foot-pounds per hour were able to accomplish the same amount of work at 60° and 70° effective temperature. When the effective temperature was increased to 80° the work accomplished was lowered to 93 per cent of that at 70°. At 85° it was 84 per cent of that at 70°; and at 90° effective temperature the percentage dropped to 68. For higher effective temperatures the percentages dropped rapidly. Again the effect of ventilation was marked. When the air speeds were increased to 350 feet per minute the above percentages were raised about 8 per cent. At this rate of work the pulse of the worker rose 17 at 85° effective temperature, 31 at 90°, and thereafter the increase doubled for each 5° rise in effective temperature. Up to 90° the rise in body temperature was not dangerous; beyond 90°, however, it was.

Experiments have shown that the healthy can stand very adverse climatic conditions without suffering permanent effects. Adverse climatic conditions below the danger level, 95° effective temperature, are never attained except under strong radiation and in confined spaces in the Caribbean area. Comfort and work efficiency are reduced at much lower effective temperatures.

Donald R. Hanson : SOME HOUSING PROBLEMS IN THE
CARIBBEAN

THE WORLD HOUSING SITUATION appears to be deteriorating rather than improving. Statistics support that impression. Statistics are also painful; they are difficult reading even while they are revealing. Relying on your ability to withstand pain, the following data are submitted.

I. Population Explosion

Consider the world's population. A person born in 1930 will see the population double in 1980 when he is 50 years of age and redoubled again by 2000 when he is 70. When you consider that it required 190 years—from 1650 to 1840—to double the population, the term “population explosion” becomes meaningful.

Latin America, and the Caribbean area especially, has the biggest explosion of all; a rate of 3.1 per cent versus the world rate of 1.8 per cent.¹

The world populations are also “shifting” (while they are exploding) to the urban areas. Latin American cities and towns increased their inhabitants from 39 per cent of the total population in 1950 to 46 per cent in 1960.

II. Housing Needs

The United Nations estimates “that over 1,000 million people in Africa, Asia and Latin America—about half the total population of

these continents—live in housing which is a health hazard and an affront to human dignity.”² Furthermore, over 200 million new inhabitants are expected to crowd into the cities of those areas during the period 1960-1970. To meet these challenges, the United Nations suggests that the targets for this period should include the construction of a total of 19-24 million dwellings in these areas, to be allocated as follows:

(1) *To house the increase in population*: construction by 1965 of 4 million dwellings and ancillary facilities annually in urban areas, and 4.6 million in rural areas.

(2) *To eliminate shortages in thirty years*: construction by 1970 of about 6 million dwellings annually.

(3) *To meet current obsolescence*: construction by 1970 from 4 to 9 million dwellings annually.³

In more comprehensible terms this means that the world must build about 10 units per 1,000 population per year to solve the housing problem.

A different way of expressing the problem has been given by Dr. Doxiades.⁴ Estimating in terms of rooms, because “dwelling is a concept which can cover widely varying conditions,” a total of 1,425 million rooms will be needed between 1960 and 1975. This is about 11-12 dwellings per 1,000 inhabitants.

The United Nations estimates for 1960-1975 are more conservative, but still add up to a staggering need for an annual housing program of 8-10 dwellings per 1,000 inhabitants.

III. Housing Accomplishments in the World

The inevitable question comes next. Can these needs be met? Before even trying to answer this question, it would be worthwhile to analyze accomplishments in a number of other countries. Taking those countries which appear to have successfully met or are meeting their current housing needs, only ten can be listed, and their output is seven or more dwelling units per 1,000 inhabitants.⁵

Finland	7.1	Sweden	9.1
France	7.0	Switzerland	9.3
Netherlands	7.4	USSR	14.0
Norway	7.4	Germany	10.3
Romania	7.3	US	7.1

On the other hand, in the developing countries the output is usually low, even falling to two and fewer per 1,000 population (e.g., India and Indonesia).

In virtually all developing countries, the portion of housing allocations as a share of gross domestic fixed investment ranges from 12 to 30 per cent. As a per cent of gross national product, the range is usually not more than 3.3 per cent. However, to meet the needs given by the United Nations and using current construction costs, 10 per cent of gross national product, or in many cases, the entire investment resources available in less developed countries would be required!

In other words, most developing countries would need to double and triple their present allocations to even reach 7 units per 1,000 population, which they will not do without great thought on the subject.

In 1952 the United Nations' study on "Housing in the Tropics" stated ". . . it must be recognized that, even under the most favourable conditions, it may be a very long time before sufficient progress has been made to permit the use of adequate economic resources for such social goals as better housing and improved community facilities. Meanwhile, with few exceptions, families in the tropics simply cannot afford to buy or rent houses built for them on a commercial basis. It is also obvious that neither Governments nor private agencies can provide housing on a subsidized basis to all in need. In addition, in most countries, the technically retarded state of the building industry is one of the factors raising the cost of house construction beyond the reach of most of the population. The physical improvement of houses and communities and the important construction work to be done in connection with transport, power and industry will be possible only by first developing an adequate building industry and related manufactures in line with each country's resources. But to accept that nothing can be done amounts to a gospel of despair. Although resources and technicians are in short supply, the aspirations of man are not. Practical solutions to the crushing problem of tropical housing must be arrived at in the near future. They should combine the initiative and resourcefulness of the people, the rational application of local materials and skills, the social advantages of group work, and the best use of resources and technical knowledge available."⁶

After more than a decade, the situation appears to be alarmingly similar today. The question then becomes, why has the world been so slow in cleaning up this mess of a housing situation? If one were to sum up the situation in a few words, the answer might be "backwardness, old-fashionedness, statics." Conversely, the solution might be "boldness, new methods, dynamics." Of course, change, whether good or even bad, causes new problems, but if this is what it takes, it seems that now is the time, before an alarming problem becomes a catastrophe.

IV. Major Causes of Housing Shortages

Before attempting to describe what a dynamic housing program might be, it may be useful to summarize the major causes of housing shortages in most of the developing countries. The following list is not necessarily given in the order of magnitude since the items would vary from country to country.

- a. The absence of a clearly defined housing policy or even of any housing policy.
- b. The rapid increase of population.
- c. The influx of rural and semiurban population into towns.
- d. The preference for large luxury houses, rather than for basic shelter.
- e. The rising cost and speculation of buildable land.
- f. The increasing cost of building materials which are often imported.
- g. The lack of basic services and facilities in buildable areas.
- h. Inadequate incentives and inducements for housing building.
- i. Insufficient credit facilities.
- j. The slow return to investors in housing in comparison to other investments, especially in low and low-middle income housing where the need is the greatest.
- k. The inability of governments alone to finance the nation's entire housing requirements.
 - l. The lack of development of the building and the local building-materials industries.
 - m. The inability of building trades to reorganize for modern building methods.
 - n. The scarcity of skilled labor and of local contractors who can organize large building operations.
 - o. The disorganization of self-help families who may build 50 per cent or more of a nation's annual housing program.
 - p. Poor and costly structural standards resulting in rapid deterioration, especially in shanty-town and rural housing.
 - q. The slow replacement of obsolete and dilapidated houses.
 - r. The operation of obsolete and unsuitable building laws.
 - s. The use of high taxation on land and new houses.
 - t. A feeble and unimaginative policy on slum clearance or on progressive slum upgrading to acceptable standards.
 - u. Inadequately organized cooperative housing developments.
 - v. The lack of research in design, construction, use of local materials, social standards.
 - w. The lack of communicating this research to builders, investors, and self-helpers.
 - x. The lack of technical assistance to self-help families.

- y. The sudden strike of natural disasters and of wars.
- z. Last, and perhaps it should be first, the lack of coordination between over-all economic plans, community development, and housing activities.

For the convenience of this paper, the list can be simplified into these subjects.

- a. Housing in the national economy
- b. Industry and industrialization
- c. Self-help housing and cooperatives
- d. Urbanization
- e. Training and dissemination of information
- f. Standards and research
- g. Land
- h. Disasters.

A few of these subjects are discussed below.

V. Housing in the National Economy

Decent housing has been recognized for some time as not merely the need but even the right of every family. This satisfies the socially oriented person. But strong objections to this philosophy are most often heard from the economists, who contend that housing, while making claims on investment resources, is unproductive in that it does not lead to a flow of tangible goods and is also not creative of permanent, as against constructional, employment. But the arguments one way or another are not that simple. Perhaps the late Prime Minister of Ceylon, the Honorable S. W. R. O. Bandaranaike, stated the case very well.

In one sense, perhaps, the case for housing in the context of development strategy is less strong. Since the rate of growth of the economy depends largely on the availability of capital goods, investment in fields which help increase the latter, e.g., export earning or import saving activities, may claim greater priority. But even here the issues are not at all straightforward. For instance, in conditions of an acute housing shortage rents will tend to rise, leading to higher living costs and increased wage demands. These factors may themselves undermine the entire development effort. On the other hand, even an effective control of rents, assuming this were possible, may only result in a diversion of purchasing power to other consumer needs and to a raising of consumer imports. The objective of import savings may thus be frustrated. Above all, inadequate housing will have such deleterious effects on the health and the morale of the population as to destroy the very basis of a successful development effort. Such an effort requires the maximum of

popular enthusiasm and support and a background of political stability. These cannot be sustained for long in a democracy if the fruits of development are too late in coming.

Some interesting conclusions have been developed by the Economic Commission for Africa⁷ on this subject. They conclude that "housing construction seems to be the most decisive factor in economic development at the moment of the transition of an agrarian society into an industrial one," and is therefore a motive force of progress. It is also a factor of productivity not only for new industries in remote areas but also for reducing urban workers' absences through illness and for improving labor productivity through high morale. Its importance in the building industry, where, relatively speaking, labor is more important than capital and where the proportion of unskilled labor is relatively high, is significant because this is the sector where rural migrants often first find work. Also, housing is a prime mover in encouraging thrift and savings. Finally, family expenditures on housing could reduce, and even prevent, the purchase of imported consumer goods, thereby contributing to improvement of the trade balance.

On the other hand, to say that housing should be granted high priority, is also not correct. It has a rightful part in development, especially if it is first directed towards economic projects such as agricultural and industrial developments; towards the development of secondary towns, which could slow down the rural exodus to the largest cities; towards dwellings that meet the greater need rather than luxury buildings for the few; and finally towards providing basic infrastructure services for that large body of families who build their houses by self-help.

To summarize, a realistic housing program should:

- a. represent 3-6 per cent of the gross national product (at 5 per cent annual rate of growth).
- b. utilize $12\frac{1}{2}$ per cent—about 25 per cent national capital formation.
- c. create 8-10 units per 1,000 population per year.
- d. redistribute housing allocations so that low-cost housing is included with emphasis on units that cost not more than \$1,000 for urban houses and \$200 for rural houses (including utilities) making maximum use of self-help, local materials, and industrialization.
- e. be coordinated with new economic development projects.

VI. Industry and Industrialization

Industrialization of the building industry has been offered at times as the panacea for the rapid building of houses. It has failed to date in the developing countries probably because its advocates have thought

only in terms of prefabrication. While methods similar to Buckminster Fuller's Dymaxion structures (which reduce construction costs by as much as 90 per cent) and similar to prefabricated concrete panels (used extensively in Europe) should be encouraged, it can be said that more flexible and adaptable methods are needed in the developing countries for the next 10 years.

These new methods should come from science and technology centers but they have not played a major role in housing solutions to date. Most of the current methods of house building are centuries old, are still being used in the developed countries, and are slavishly being copied in the developing countries. What is needed, for example, are battery or solar power electronics to harden mud bricks. Or use of foam plastics with low-cost equipment and throw-away type spray guns to create entire houses in 3-4 hours. The foam could be sprayed on framework of sticks, bamboo, or thatch and could cost less than \$300 for a 400-square-foot house.

These new methods could ideally be financed through foreign aid and would create new local industries and jobs.

VII. Self-Help

Another panacea offered to developing countries has been self-help. Unfortunately it is another process whose full potential has not yet been realized. Its use, however, has never been in greater need than today. Self-help housing can make better use of existing funds, for two rooms in a self-help house can be built for the price of one; or, about two houses could be built (and twice as many building materials needed) with the same funds. Banks, so timid about entering the low-cost housing field, should find the difference between the value of the house and its actual cost a desirable investment factor.

But if governments do not support and help to organize self-help housing, the people will usually undertake it in any event, although often creating slums in the process. An example given for a Latin American country is equally applicable to Africa and Asia. "In a seven-year period, 1949 to 1956, the government built 5,476 houses which was less than 1 per cent of the housing deficit during those years, and at a unit cost that made repayment by the average urban family impossible. And this was an exceptionally active period in government building work. During the same period no less than 50,000 families took matters into their own hands and solved at least part of their housing and community development problems on their own initiative and outside the

established legal, administrative, and financial superstructure.”⁸ From this typical case, it would appear more logical for a government to place more of the proper tools, techniques, and knowledge in the hands of these families if the housing problem is to be solved at all.

For greater detail on this subject, the Conference should refer to the United Nations Manual on Self-help Housing. The Manual provides principles and practical techniques for developing successful self-help projects.

VIII. Urbanization

Everywhere, in both developed and developing countries, urban populations are increasing at faster rates than the general population. The developing countries are more fortunate, however, in that they can analyze the overcrowded “developed” cities of the world and can plan for the prevention of similar ills.

Dr. Barbara Ward, in *The Process of World Urbanization*, has singled out a few of the major considerations all governments should analyze. The family motor car, a status symbol of all parts of the world, versus mass public transport is a major consideration. The two approaches call for entirely different town plans. The tendency for the world’s urban population to be concentrated in growing urban agglomerations requires a decision as to whether it is better to decentralize the population or to develop existing ones. There is no clear-cut evidence as to which method is better; yet, it does seem, according to Dr. Ward, that “large numbers of citizens would rather not have urban sprawl if there were genuine alternatives.” In either case, the need for administrators in the broadest sense of urban development and planning is great. Only they, and time, can provide the knowledge to determine the best solutions.

So-called “squatters” and urbanization seem to be partners. Charles Abrams has stated that “one of the main factors that will control the city’s future pattern will not be what is put into the blueprint as much as what will be imposed by squatter settlement movements. If influxes are anticipated and planned for, the planning can be substantially preserved. This calls for a designation of sites on which settlement will be permitted and those on which it will be proscribed. It calls for firmness with understanding. It entails a policy of land layout that will permit settlement according to plan, help with materials where essential, and even undertake some inspirational building by the government to influence the character and course of growth. Squatters will settle where they can if they are not told where they may. They will build what they can

afford if they are not helped to build what they should. The houses will improve with time and with better economic conditions if the squatters are given a stake."

IX. Disasters

Natural disasters can be both a horror and a blessing in disguise. The hardships and deaths can never be compensated for, yet the funds and technical assistance that come from world organizations and sympathetic nations following the wake of hurricanes, earthquakes, and other disasters can rebuild entire regions in a way that governments never seem able to organize. Therefore, it would be not only farsighted but even extremely beneficial to the people, if each government would prepare emergency plans for rehousing and resettling victims. Disasters happen often enough to make this a worthwhile project in the development plans of every country.

X. Conclusion

The above suggestions are but a few of the more important approaches to solving the housing problem. There certainly is no one panacea, but a giant step will have been taken if developing countries recognize that urbanization and natural disasters are inevitable and must be planned for, that greater use must be made by housing people of the "brains" in science and technology, and that the industrialization of housing is essential. If these actions are then coupled with the creativity and energies of the people who need housing the most, through their self-help efforts, perhaps in 10 years time we will begin to see the tide turn, and realize that the housing problem can be solved.

NOTES

1. Based on medium variant of statistics in the *Demographic Yearbook 1962*, United Nations, New York.

2. *The United Nations Development Decade Proposals for Action* (United Nations publication, Sales No. 62, II, B. 2) p. 59.

3. *Ibid.*, pp. 61-62.

4. *The International Programme in Housing, Building and Planning*, a Report to the United Nations Committee on Housing, Building and Planning, 27 January 1964.

5. *Annual Bulletin of Housing and Building Statistics for Europe 1960*, United Nations publication, Sales No.: 61, II, E. 5, table 5.

6. United Nations Bulletin 6, "Housing and Town and Country Planning," ST/SOA/SER.C/6, Sales No.: 1952, IV, 2, p. 2.

7. *Housing in Development Planning*, August 31, 1964.

8. John C. Turner, Catherine S. Turner, Patrick Crooke, "Dwelling Resources in South America," *Architectural Design* (London, The Standard Catalogue Co., August, 1963), p. 389.

Leonard J. Currie: HOUSING AND HEALTH IN THE
CARIBBEAN

I. Introduction

UNDER SOME SYSTEMS of geographic classification, the Caribbean countries and peoples comprise the island nations of the area. From a perusal of the themes of prior conferences of this series, our Conference is considering the Caribbean as all of those countries or places whose shores are washed by the Caribbean. This certainly has validity, and is a necessary assumption if we are to include Florida, and hence our Conference site, in the Caribbean area. Yet, just as Florida has multiple affinities—it is at once part of the Caribbean, part of the United States, and an Atlantic seaboard state—so Colombia may be regarded as a Caribbean country, an Andean country, part of South America, etc. In like manner, Costa Rica is an integral part of Central America, and of Latin America, and is oriented toward the Pacific as well as toward the Caribbean. Hence the references I shall make and the examples I shall show will for the most part deal with Caribbean countries in the broad sense of the Conference—especially Venezuela, Colombia, Panama, Costa Rica, and Mexico, all peripheral to the Caribbean, and Puerto Rico which is Caribbean by any definition. However, housing problems have a certain commonality and relatedness throughout the world, so we may occasionally range over Latin America and even make reference to other world areas.

As this audience is varied in its interests, my remarks may at times be directed primarily to the students of architecture, at times to students who are potential Peace Corps candidates, and at still other times to

those most interested in the healthful aspects of housing. I hope this is not too ambitious for one brief session, but I suggest that we attempt to consider simultaneously the subject of housing under three broad categories: housing in its relation to health, housing as a factor in socioeconomic development, and housing as an aspect of international technical assistance.

II. Awakening of a World Region

I propose to sketch briefly what is happening in and around the Caribbean, outlining the tremendous social and economic changes which are occurring, the basic problems that underlie the changes, and the new problems created by this upheaval. Within this milieu, the nature of the housing problem can be considered along with the constructive steps taken to resolve it, and with the principal shortcomings of present housing problems. Realizing such an exposition would properly require an entire semester course, I shall quite shamelessly attempt to summarize it in a few minutes.

It is really difficult to generalize about an area so vast and varied as the countries surrounding the Caribbean. In size, the countries vary from the smallest ones: Haiti, with only 10,700 square miles, and Costa Rica, with only 1.4 million inhabitants (and the world's highest rate of demographic growth), to Mexico with over 760,000 square miles of territory and more than 35 million people. Geographically, the region encompasses mountain ranges with snowcapped crests, great deserts, rain-forest areas popularly known as jungles, bleak, windswept mountain plateaus, great plains, fertile valleys, and numerous tropical islands.

While presenting a greater unity of tradition, culture, and language than the population around other comparable bodies of water, such as the Mediterranean, the Caribbean peoples vary greatly from one country to another and even within countries. Except in the United States, along the northern shores of the Caribbean basin, Spanish is the predominant language of the region, with French in Haiti and Martinique, Dutch in Curaçao, and various native Indian dialects in several of the South and Central American countries. In some areas, people of pure Spanish descent are in the majority, in others they form the small upper class. Many of the Indians of the Andes and in Guatemala, as well as the wild tribes in the jungle interior of Venezuela, have preserved their traditions, language, and ethnic purity, seemingly unaffected by European colonization. However, more typically, the Spanish populations have blended to a greater or lesser degree with the various indigenous

groups to form mixed cultures. Relatively recent immigrations of Germans, Italians, and British in some places have markedly affected the commerce and the political institutions, and have somewhat modified certain local cultural patterns.

Considering the greatly varied natural resources, the general potential of the Caribbean region appears to be virtually unlimited. In addition to fertile agricultural lands suited to cultivation of all types of fruits, sugar, coffee, cereals, truck farming, cotton, and grazing, the region has a variety of forests, tremendous water-power potential, and great mineral resources, including some of the world's richest deposits of iron ore and petroleum.

One might well ask why this area of the world, and indeed all of Latin America, with its magnificent possibilities, remained for so many centuries after the Spanish conquest as a decidedly underdeveloped area and only very recently has begun a rapid and uneven economic development. The great hindering factors have been both natural and human in their origins, and remain to be considered in any present and future programs.

In order to develop the basic essential transportation and communications systems, it has been constantly necessary to fight against rugged mountainous terrain, thick jungles, torrential rainy seasons, and numerous debilitating tropical diseases. However, when we consider that before the arrival of the Spanish, the Inca civilization had achieved an astonishing road-net, erosion control through extensive agricultural terracing, and irrigation projects in the extremely rough Andean region, we must recognize the existence of many man-made obstacles to progress. It should be noted that the deterring human factors apply more to some countries than others, and that they are now being overcome in many places. They include: widespread illiteracy and superstition, marked class distinction with very little middle class, a tradition that manual work is degrading, and undue emphasis on externals, wars between countries, and countless revolutions.

In recent years a new problem has arisen as the most serious obstacle to development and to the attainment of a decent standard of living—a problem that stems from the success of the health programs. I refer of course to the population explosion which more than cancels out the growth in the gross national product of the various Latin American countries. The birth rate in Latin America has not gone up; rather, the death rate has gone down markedly, due to sanitation programs, increased food supply, malaria control, and other public health measures. This points up the kinds of imbalances caused by uneven development.

For years the various international agencies and the foundations have focused their technical assistance on the health and nutritional programs of Latin America, but little attention has been paid to education, housing and planning, community development, and the manifold social and cultural problems of life in large metropolitan centers.

III. Focus on a Local Subculture

Having painted the picture of Caribbean problems with a broad brush, I should now like to illustrate how we must focus in our housing studies on the specifics of a local area, and from them develop some principles and guidelines for action.

The anthropologist Professor Gerardo Reichel-Dolmatoff, of German origin but a long-time resident of Colombia, tells us something about the attitudes and aspirations of the people of the rural Magdalena valley and Atlantic coastal regions of Colombia and how the cultural patterns influence the design and construction of houses. Professor Reichel-Dolmatoff is careful to qualify his observations as applicable only to the northern Colombia area which he has studied for many years, but his study area includes the *campesinos* on the slopes of the Sierra Nevada de Santa Marta, which lie near the Venezuelan border, so observations might be extrapolated (with caution) to other areas of Colombia and Venezuela. The rural people, who migrate each year to Caracas, Bogotá, Medellín, and Cali and build their squatters huts around the cities, come from such areas as the Magdalena valley, the Atlantic coast, and the Santa Marta mountain range. They bring with them their deeply ingrained attitudes and values as regards clothes, food, manual labor, the house, alcohol, sex, illness, family life, neighbors, etc. Indeed, many who read Reichel-Dolmatoff's little report, *El marco cultural en el estudio de la vivienda*, published in 1953 by the Interamerican Housing Center (CINVA) in Bogotá, find that much of what is described might be useful in explaining attitudes and habits that recur throughout Latin America.

The "prestige complex" and the resulting behavior pattern of the Magdalena *campesino*, and probably the rural peoples of most of Latin America, is not derived from the Spanish or Indian cultures, but appears to be uniquely mestizo or *Criollo* or what Reichel-Dolmatoff prefers to consider as a "culture in transition." Unlike the developments in the Andean countries to the south, the biological and cultural mixing occurred very rapidly in Colombia and Venezuela during the Colonial period. The Spanish cultural forms, language, clothes, religion, and beliefs were

quickly adopted as being civilized, desirable, and ideal. All those forms stemming from the Indian were rejected as "uncivilized, despicable, and inferior, even though many of the Indian attitudes and beliefs continued beneath the veneer of a culture that strove to be Spanish. The term "Indian" came to mean—and still does—the lowest social state; it is not an ethnic description but rather a term of social degradation.

Time does not permit our elaboration on this theme. But, briefly, in Colonial days the Spaniard did not work with his hands, and especially he did not till the soil. The Indian, the inferior being, did work with his hands and did till the soil. In a mestizo culture no one wants to be inferior; each person wants to adopt the ideal of the superior, or Spanish, model, and hence assiduously avoids physical labor; if work such as tilling the soil must be done, it is performed, not with pride, but with a great sense of shame and humiliation. If a man is forced by necessity to work for someone else as a farm laborer, he will frequently go to a nearby village or rural district where he is not known, thus avoiding the ignominy of facing degradation in his own community.

Prestige is the most important of motivations, and the top status symbol in the Magdalena valley is clothing. Laborers digging a trench for an oil line will often wear silk shirts imported from the United States. On certain feast days everyone is expected to appear on the streets with a complete set of new clothes, much like an exaggeration of our Easter bonnet tradition. Those who simply cannot secure the cash or credit for the new clothes—especially girls—will remain in their shacks all day behind closed shutters rather than appear in public with used clothes. To shift our focus to another country, Costa Rica, with quite a different ethnic and cultural background, I recall from a housing study that I made there some years ago that Costa Ricans spent as much as 90 per cent of their income on clothes and yet many spent nothing on housing.

Sickness conveys status, as do also modern and expensive remedies such as penicillin. To have injections is much more prestigious than to take oral remedies. The maids and cooks in all Colombian and Venezuelan cities are, by and large, country girls, and I have noted that they preserve these same attitudes and values.

Food, housing, and education for the children are ascribed little or no prestige value, so are readily sacrificed for the gratification that comes with expenditures for status symbols—especially clothing—but also liquor and medicine.

In the rural Atlantic coastal regions, the family structure is rather complex and unorthodox from our point of view. Legal marriages are costly and overly restrictive, and hence not common. More usual are

common-law relationships, with the men tending to wander off and work, to return only at unpredictable intervals; often the man will have several women at different locations, with each woman maintaining a house and family. To establish more or less permanent relationships with a woman, a man is obliged to build her a house which then becomes her property. This is of considerable importance in any study of housing problems and programs, as the views and desires of the woman are thus of even greater importance than is the case in North America. The man is the owner of the fields and this ownership is passed on from father to son, while the house is passed from mother to daughter. In one typical village studied, three-fourths of the houses were owned by women.

While housing conveys very little status—being something primarily for the women, or *mujeres*—some houses have more prestige value than others. Traditional houses, including original Spanish Colonial houses several centuries old, are considered ugly. Everything old is ugly or *feo*; everything new is pretty or *bonito*. Houses with thatch or tile roofs that can be seen from the street are far less prestigious than those with pretentious false fronts of cement stucco. In Cali and in Bogotá, I have heard such added façades referred to proudly as *fachadas de prestigio* (prestige façades).

Again to quickly shift to another place, Puerto Rico, I recall discussing with the head of a government agency the small single-family houses being built by that agency. I expressed some concern about the flat concrete slab roofs—the houses being little concrete boxes under the tropical sun—and the insufferable radiant-heat, cooking the inhabitants as in an oven. The agency head gave me the standard, official answer, that Puerto Rico has no lumber and no other building materials except concrete (which is really not true). I suggested that some sticks and thatch, which seemed readily available for huts in the rural areas, might be built over the concrete roofs to shade them. He then got down to the real reason and said, “The grass roofs are a symbol of poverty; our people are most anxious to eliminate such a symbol; they will put up with anything to avoid having a grass roof.”

In Panama, about a dozen years ago when air conditioning was still uncommon, I attended an elegant cocktail party at the Peruvian Embassy, a large, pretentious residence in the neo-classic-Mediterranean-Spanish-California-cement-stucco-style set on a generous lot in the swankiest area of Panama City. The party was well attended and we were packed in like sardines, with all of our white linen suits and the ladies' white dresses soaking wet with perspiration and all of us nearly suffocating. Any sensibly designed house in such a climate would have been

completely open to the breeze. Lacking that, the party could have been out of doors, but that would not have been as prestigious and formal. I noticed that this house, and each of its neighbors as well, had a sort of tea-house in the garden, an open shelter with four corner posts supporting a wood and thatch roof—just like those seen in the countryside. On less formal occasions, with only the family present, they could sit out under the shade of the thatch roof and be served with food and drink in great comfort. If anyone were to suggest that the Panamanian government (or any Latin American government) might use thatch *paja* for roofs of public housing projects for low-income groups, the idea would be immediately rejected because of the fire hazard and because such roofs tend to harbor vermin and snakes and insects. Yet in all of the hot regions in Latin America the wealthy people have garden shelters with thatch roofs and they go on vacations for weeks at a time living in ancient houses with thatch roofs—and loving it.

To return to the subject of the houses in the Magdalena community, they are much like those I have seen in many other regions of Colombia. The house is rectangular with a gable roof of thatch or palm leaves, walls of *bahareque* (a form of mud-and-wattles), and the floor is of dirt. In plan there are two rooms side by side, one being the *sala*, or parlor, with a window and with doors front and back. The *sala* has a mirror, the image of a saint, seats, and any other objects of prestige the family might own. This is the formal room, strictly for show and to receive visitors, much like your grandmother's parlor. Next to the *sala* is the *apuesto* (sleeping room), without windows and with an access door only from the *sala*. This is the intimate room of the house, with the hammocks or cots, trunks or boxes filled with clothes. It is hot, dark, dirty, and infested with insects.

Going through the *sala* to the back of the house, one finds a fenced patio where most of the real living takes place. Here is the kitchen—generally four posts with a bit of roof over it; at times the kitchen has walls about it, but it stands free of the main house. The patio is where the woman, the children, the pigs, chickens, and dogs, spend most of their time. This is where the corn is ground, a pile of wood for cooking is stored, where one finds a few potted plants growing in old tin cans.

One factor that influences the orientation as well as the design of the house is the popular belief that winds bring sickness (which may have had some basis in fact when malaria and yellow fever were more common). Often whole communities have all the houses oriented so that the prevalent northeast wind will not blow into the doors. The windward side of the houses always has blank walls without windows. The bed-

room has a small air vent about the size of a brick. However, it is believed that the wind, or fresh air in general, can be fatal for sick people, pregnant women, and babies. So when any of these are present, the vent hole is stuffed with cloth and the room becomes completely dark and free from any movement of air. The belief in witches and spirits is also a consideration in this matter.

The attitudes and habits we have been discussing are centuries old. When these people migrate to the city and build their squatters shacks on public lands or on the banks of the streams, they generally build a smaller and more miserable facsimile of their original farm home. What does this suggest in the planning and design of new housing for these people? What would be their reaction to bedrooms with large windows? There seem to be two alternatives: one is to design and build in complete accord with the established traditions; the second is to educate and persuade and thus modify the behavior patterns. In practice, some combination of these two approaches seems indicated. But in any event, it is first necessary to become familiar with the traditions, beliefs, and habits of any particular group, and it is also well to remember that it will take considerable time and effort to educate the *campesino*, to change his pattern of living and his values, and for him to accept and maintain a different kind of home.

The widespread belief that bad odors carry disease makes it difficult to persuade the *campesinos* to use outhouses, called *letrinas*. They may wish to have a *letrina* if it has some worth as a status symbol, but as it inevitably smells bad, it is hence dangerous, and they prefer to relieve themselves in the fields as they have always done. In some regions, ownership of a water closet carries sufficient prestige that a few houses will have them, but not necessarily installed so that they can function. A water closet is something to *possess*, but not to *use*!

In many rural areas of Colombia and Venezuela, concrete floors are a sign of prestige and they are often appreciated because they feel cooler to bare feet. The greater hygienic value of concrete floors as compared with dirt floors is not understood and hence not given any consideration. Often only part of the house will have a concrete floor, and that part will be the *sala*, of course.

It has been wisely observed that the rural peoples in underdeveloped countries throughout the world, in India, Africa, and Latin America, have much more in common with each other than with the upper classes in their own countries. Among many of the professionals and intellectuals in Latin America, there is a tendency to insist upon unrealistically high standards. While our students at the Housing Center were hearing

lectures and studying examples such as I have been citing, one of my staff, an intelligent and capable Latin American architect, educated in the United States, was working on a model set of housing standards, to be adopted (hopefully) by various Latin American National Housing Agencies. He was following the "Standards of Healthful Housing," a bulletin promulgated in the United States, with its minimum room sizes, and not more than two children of the same sex per bedroom, and other specifications. If I had been so indiscreet as to suggest that the typical Latin American laborer or peasant would not know what to do with a house built to such standards, I might have triggered a suspicion that I regarded the Latin Americans as inferiors and not good enough for United States standards.

To cite a specific case related to customs and standards, the Rockefeller Foundation and the Colombian Ministry of Agriculture cooperatively operate an experimental agricultural station called Tibitata in the high plains, or Sabana, about twenty miles from Bogotá. At the station they do such things as develop new strains or varieties of wheat suited to the local climate. For a time their few, regular, farm workers came daily from a nearby village. It was then decided, in order to protect the experimental crops, to build several houses for these farm workers at scattered locations around the periphery of the farm. The Rockefeller Foundation agronomists, not having given much thought to housing standards, secured plans from the United States of typical modern farmhouses, not unlike FHA-financed, suburban 5-room houses. Shortly after completion and occupancy of the dwellings, the United States agronomist directing the experiment station noted a surprising number of people coming and going from one of the houses, so one day he asked the tenant employee, "Who is that going into your house?" "Oh, that is my Aunt María." "And who is that who just came out?" "Oh, that is my cousin Juan." And so it went! It turned out that there were the equivalent of four or five families living in this one house. The tenant's income was steady and probably double that of his fellow villagers, but since his family had always lived in one room, or possibly one room plus a *sala*, what could they do now with a 5-room house?

Family ties are strong in Latin America. If one member of a family does well, which is clearly a matter of good luck or "fate," his cousins and second cousins are apt to arrive for an endless visit to share his good fortune with him. When Pedro moved into his new house on the experiment station, the very effective grapevine communication system doubtless transmitted the message rapidly to all members of the clan, many possibly living in Boyacá or Valle. There was undoubtedly much

exclamation and elaboration in describing this "house of luxury" with water and electricity and "five rooms, can you imagine?"

IV. The Housing Situation and Housing Education

During my years at the Interamerican Housing Center, or CINVA, as it is called in an adaptation of the Spanish title, *Centro Interamericano de Vivienda*, the eager young students came to us from all over the hemisphere searching, as for the holy grail, for the miraculous "housing penicillin." It took us a year of dedicated work with the graduate students to bring them to realize that housing penicillin does not exist and is never likely to exist. In this process we succeeded in making "housing experts" out of them, and in them lies the only real hope for housing progress in Latin America. A housing expert is a person who knows how little he knows about the remarkably subtle and complex and diffuse subject which is characterized as housing—which, incidentally, is a most inadequate term to describe the physical environment of humankind. As many of these CINVA graduates are now in influential technical or policy-making positions in their national housing agencies, and on the faculties of universities, they are beginning to shape national housing policies and programs along realistic lines, to counter the tendency toward simplistic improvisation, and to educate more Latin American youth in the understanding of the manner in which environmental problems are inextricably interwoven with traditions, superstitions, public health, mental health, delinquency, productivity, economic development, and almost every other aspect of human life.

The more that we study housing, the more it becomes evident that housing is not a problem of walls and roofs, but rather a problem of people. It is a problem of people and their attitudes, their aspirations, their motivations, their cultural level, and how they live and interact together in families and in communities. Housing improvement must come, step by step, as part of an even development, as part of the gradual educational, social, and economic advancement of a people. If environmental conditions lag behind general development, they serve as a brake to that development; if an attempt is made to advance too far and too fast in environmental terms—ahead of the aspirations and the cultural developments of the people—the results will be disastrous as well as economically wasteful, as I have noted where nutritional and public health programs have gotten ahead of general socioeconomic development. There is considerable evidence that when families move from slums into new and improved housing, rates of crime, disease,

infant mortality, etc., tend to decrease, if the change is not too abrupt, if the families are able to adapt to their improved surroundings, and if the change is accompanied by programs of social service and basic education. However, slum mentalities breed slums; if people living in a pigsty are moved into a palace, they will soon turn the palace into a pigsty. Unless the people change in their attitude and habits, the slums will accompany them wherever they go.

To cite the wide range of climates throughout the region is to give only a hint of the essentially local nature of the housing problem and the essentially local nature of its solution. The people and their habits and culture and economic resources vary even more markedly than do the climate and terrain.

While it should be evident that the housing problems and housing programs in Haiti—with its barter economy, voodooism, and universal illiteracy—has little in common with the problems and programs of advanced cities like Caracas or Mexico City, it is often overlooked that within a very large country like Mexico one can find a wide range of climates and almost infinite economic and cultural variations. Even within a country as tiny as Costa Rica, about the size of New Jersey and with one of the most homogenous populations in the hemisphere, the factors of climate, tradition, local materials, and the local economy suggest a great number of differing solutions to the local housing problems.

The Latin American housing problem is just one sector of a world problem, and rather typical of that problem. We now have three billion people in the world and an alarming rate of population growth. About two-thirds of the world population, or two billion people, are inadequately housed. Just for argument, let us assume that by means of some remarkable technological break-through we could produce an adequate minimum house, ship it to its site, and erect it for \$1,000 per family—or \$200 per capita. This is a manifestly farfetched assumption, as it generally costs more than this to acquire and develop the land and provide water and sewer service before we spend anything on the house itself. However, even with such hopeful estimates, it would thus cost \$400 billion to meet the immediate housing needs, and the needs are growing every day. It seems evident that such funds will not become available, and a more realistic assessment of costs within our technological capabilities would raise the figure to several thousand billions of dollars. It is clear that such sums simply are not available.

The great masses of people who have the most severe housing needs have more time than money, and they have traditionally built their

houses with their own hands and with locally available materials—sometimes with stone or wood or bamboo, but mostly with earth, or with earth and wood in some combination. The walls of most of the houses in the world are of adobe, rammed earth, sod, or mud-and-wattles. Roofs are framed with wood or bamboo, and covered with cane, thatch, mud, or locally produced tile. Even brick, which is used so widely in the technologically advanced countries (as well as by the Assyrians 5,000 years ago) is merely a baked adobe block.

Therefore, I submit that if a solution can be found to the housing problem of Latin America and of the other poor areas of the world, it will involve a large measure of self-help—people building their own houses—with locally available materials—“found” materials that cost nothing or very cheap materials involving little or no transportation—and the materials will be principally earth and wood. I am now referring only to the shelter—the walls and roof—which I consider as a minor segment of the housing problem, especially in warm or moderate climates.

As the urbanization of the population continues as the *campesino* moves to the cities and to the peripheral slums that ring virtually all Latin American cities, the problems of community living loom larger than those of simple shelter. Unused to crowded urban life, unlettered, unemployed or underemployed, blessed with virtually no economic resources, the poor *campesino* tries to feed his family and maintain a semblance of the only life he knows by keeping a few pigs and chickens along with the children in the shack or in the mud of the tiny patio, cultivating postage-stamp-sized gardens, defecating in the patio or the path that serves as a street, and dipping water from the nearest filthy river or drainage ditch. The priority needs for these people, in terms of physical facilities, are: water supply, sewage disposal, access streets, electricity, play areas, schools, community centers for meetings and adult training, churches, and clinics or dispensaries. They desperately need social service and training programs, guidance in organizing and carrying out community improvement programs and in developing group leaders. All of this implies planning—physical planning, social planning, and economic planning.

You will note that I have put no priority on the house itself—the basic shelter—the item on which most of the Latin American governments have spent all of their scarce and precious appropriations for housing. And the results of housing efforts have been really insignificant in relation to the problem—like a drop of water falling on desert sands. There is a marked tendency to build houses to excessively high standards

with government funds, yet streets have not even been leveled by bulldozer, and no provision made for water and electricity, to say nothing of the essential community facilities.

In relation to the urban housing problem, which must be considered quite apart from the rural one, I would urge that available resources for housing be used to prepare realistic comprehensive plans, to zone and subdivide the land, to establish a street pattern and land-use pattern which would anticipate long-range requirements, to preserve land for community facilities, and to provide water mains and sewers. Initially the water would be available only at occasional water points, but the system would be planned for eventual service to each dwelling unit. The qualified families would acquire a lot through nominal purchase, or through paying ground rent, and would be allowed to build their shacks much as they do now, but the subsequent progressive improvements would be within a favorably disposed framework of land-use and land tenure.

This is not a new idea—in fact, nothing I propose is new; these are just simple, common-sense concepts that need to be understood by more people in policy-making positions. What I have just described is the basic idea used in Puerto Rico and elsewhere, often referred to as “land-and-utility” schemes. Well known as it is, why was this technique not used for the large working class residential areas of the two great new cities built in recent years—Chandigarh and Brasilia? Both India and Brazil were desperately short of capital for housing and city building, so the inherent economy of such a scheme should have been appealing. In the case of Brasilia, it would have directed the energies and materials and the substantial capital investment that has gone into the free city—the shanty town city of the workers adjacent to the glittering official city—the living city—the city of the people—the city that is supposed to be wiped out when Brasilia is completed, but which will *not* be.

Another technique that has much promise, aided self-help, is often advocated but seldom used. This form of technical assistance at the village or neighborhood or *barrio* level can be used in several ways—in the progressive upgrading or replacement of the first shacks of a land-and-utility scheme, in fomenting community improvement projects, and in village and rural housing improvement. Aided self-help is not easy to organize and administer; it involves more of education and group social work than of construction techniques. The resulting benefits in building *people*—developing leadership, skills, pride, personal confidence—through such projects, are of greater long-term benefit than the building of *houses*.

For those who are inclined to think that everything can be done better by private industry, I would suggest that the profit incentive must always be present for business to operate, and there is a very limited prospect for profits in ministering to the housing needs of the low economic groups in the underdeveloped areas of the world, at least in the first stage of their development. The work that I describe—the most urgent problem which involves education and social work—must be undertaken by governments, international agencies, and eleemosynary institutions.

Private enterprise has a role, of course, in indirect ways, mostly in the area of power development to serve new industry as well as domestic needs, in steel and cement plants, production of cement-asbestos for roofing, and development of the lumber industries in the various countries. Tree farming, forest management, scientific cutting, standardizing of lumber sizes, drying and treating lumber could improve quality, reduce lumber costs, and greatly stimulate the use of wood for housing and other purposes in the urban areas.

V. References

Before leaving the subject of the rural areas where the prevalent Latin American mores and attitudes are incubated, I should like to refer you to several items of essential reading which time does not permit me to summarize. One is the recent special supplement on Mexico in the March, 1964, copy of *The Atlantic Monthly Magazine*, and especially the article entitled, "Love and Authority," by the North American psychologist Michael Maccoby, who reports on his work and observations in a Mexican village which he calls "Las Cuevas." The village could equally well be anywhere in the Caribbean area. Maccoby brings special insight and perception to the manner in which the feudal heritage and the *patrón* system of authority has weakened the peasant's self-reliance and undermined the moral supports of reliability and cooperation; this will help explain to you why the local people often work to please the foreign expert or the Peace Corpsmen assigned to their village, but not for their own satisfaction.

Another book, available in paperback edition, is *The Silent Language*, by the anthropologist Edward T. Hall. This book, a brief and practical commentary on comparative cultures, enables you to realize how and why other peoples have quite different concepts of such things as time and bargaining patterns than you have. It points out how your physical proximity to persons of another culture under specific circumstances can put them at their ease or so disturb them as to hinder your communica-

tion. Much of this material was prepared by Dr. Hall when he was giving an orientation course for United States specialists on Point-4 missions, so it is most pertinent for all who are concerned with technical assistance programs.

A third is the brief CINVA report that I referred to, by the anthropologist Reichel-Dolmatoff. It is called, "El marco cultural en la estudio de la vivienda." If it is not out of print, you can get it by writing the Interamerican Housing and Planning Center in Bogotá. The address is Apartado Aereo #6209.

VI. Conclusion

The most common housing misconception in Latin America is the idea that masonry housing is eternal, that when a family acquires a newly built house their housing problems are solved for all time. The concept of housing as a replaceable and replenishable item is rarely understood in Latin America or elsewhere. When a hungry person has a good meal, it is not expected that it will sustain him forever. It is generally understood that a suit of clothes will wear out and must be replaced. The cycle of housing replacement is longer than that of clothing or food, but housing is every bit as cyclical as are our other basic human needs. Ruskin to the contrary, when we build we do *not* build forever. Housing is not a problem that can ever be solved and then forgotten. Houses are built; they depreciate, become obsolete, decay, and are demolished. For various reasons all this takes place more rapidly in Latin America than in the United States. Hence, the housing problem will never be really solved in Latin America or anywhere else on earth. Housing and rehousing is a basic and never-ending and ever-challenging human activity.

We in North America have several reasons to be vitally concerned with the economic development and the raising of living standards in Latin America: first, we realize that such development is important in our hemispheric defense; second, it is essential to stop the spread of Communism in the Americas; third, it is useful in the growth of our international trade. However, there is another more basic reason, a reason that would impel us to do our utmost to raise living standards throughout Latin America even if there were no Communist threat in the world, and that is our inherent American sense of fair play—our unabashed idealism—our recognition of the great Judeo-Christian philosophy of the essential brotherhood of man. Fortunately, poverty is not endemic and need not be the eternal lot of any people.

Felipe García Sánchez and Gilberto Balám: SOME
CONSIDERATION OF RURAL AND URBAN CHANGE IN
MEXICO

I. Introduction

PRIOR TO THE CONQUEST, the indigenous communities depended upon a ceremonial epicenter which was later changed by the European conqueror to an urban mestizo epicenter. This destroyed the base of the ceremonially centered culture and organized a feudal economy which imposed obligations and taxes.

The native woman progressively assimilated elements of the occidental culture, thereby changing her traditional ideas and practices. She often learned a small amount of the national language as well.

During colonization, culturization was bound to the interests of the dominant group; it was a culturization induced by the Spanish and was limited to religious aspects and political organization. It resulted in the regional integration of aboriginal communities and a mestizo center. Upon achievement of Independence, the mestizo culture and the secularization of institutions became more consolidated.

The Reform movement prepared the way for the restructuring of Mexican society under the patrons of liberalism without achieving national integration of the indigenous people. Ecclesiastical property disappeared and private property characteristic of haciendas with peons appeared, thus leading the way to the democratic Revolution of 1910. Since then, the communal farms and rural schools have been useful instruments in the transformation of Indian and mestizo towns, although several isolated groups, in forests, deserts, and tropical marshes, have

progressively incorporated themselves into occidental culture. Communication, assisted by technical advances, such as roads, radio, press, is contributing to the integration of the indigenous communities and encouraging racial rapprochement, cultural fusion, language unification, and the economic equilibrium of the groups (1).*

II. Demography

According to accounts in the year 1521, Mexico had 7,264,059 inhabitants; after 300 years of Spanish domination, that is, in 1820, the population was only 6,204,000 due to a very high mortality rate caused by massacres, subhuman living conditions, exploitations, and epidemics.

From 1821 to 1921—after 100 years of independent life—the population doubled; in 1921 there were 14,334,780 inhabitants, notwithstanding the fact that the country had had important social movements: liquidation of the Independence movement, Centralism against Federalism, the Reform, and the Mexican Revolution.

In 1930 the population registered a figure of 16,552,722 and in 1960 it was 34,923,129. The aforementioned figures indicate an increase of 209.8 per cent, which means that the population doubled in 30 years.

As in all small industrialized countries, the rural population of Mexico still predominates over the urban; in 1930, the rural population accounted for 66.5 per cent; in 1940, 64.9 per cent; and in 1950, 57.4 per cent. In 1960 it was estimated at 50 per cent (2).

III. Ecology

The great climatic contrasts of Mexico allow a vast diversification of products and establish the basis for regional specialties and social and cultural division of groups. The physiographical environment in which the Mexican population lives is characterized by broken terrain which is a consequence of mountainous areas. Two mountain ranges cross the country, forming the so-called Mexican Plateau, which comprises approximately one-third of the national territory and has an average altitude of 1,700 meters with extreme altitudes of 2,600 meters.

The high ranges and plateaus with steep, rugged slopes create a scarcity of deep river beds, and explain why the majority of the rivers are not navigable. The pluviometric conditions are characterized by very short periods of rain. It is estimated that in 53 per cent of the territorial area it rains less than 60 days of the year, in 28 per cent from

*Italicized numbers in parentheses refer to the numbered items in References on page 41.

61 to 90 days, and in the remaining 19 per cent more than 90 days. The average annual temperature range is 15° C. Approximately 52 per cent of the ground is arid with 104 million hectares, 41 per cent semiarid with 82 million hectares, and 7 per cent humid with 14 million hectares. For this reason, Mexico has very few favorable conditions for its development. However, application of modern and scientific techniques have permitted adequate exploiting of natural resources—renewable and non-renewable—which exist apparently in great quantities but are anti-economic in actuality.

IV. Housing

According to the 1950 census there were 5,259,208 dwellings, of which only 19 per cent were in adequate condition, with water service and a minimum of comfort; 62 per cent barely reached normal conditions; and the remainder lacked the most elementary necessities of habitation. It is actually estimated that 25 per cent were in good condition and 55 per cent in semihabitable condition (2).

In 1960, of the 34.9 million inhabitants, 12.5 million (36 per cent) had public services—potable water—and 22.4 million (64 per cent) lacked these services, or had them very rudimentarily. Of the 12.5 million who had potable water, 4.5 million lived in the Federal District (6).

During the last few years, several official agencies—the Mexican Social Security Institute, the Institute of Security and Social Services for State Workers (ISSSTE), National Housing Institute—and several private banks, such as the Banco de Crédito Hipotecario, have been sponsoring programs for the construction of dwellings, principally in cities for the labor sectors and in this way efficiently contributing to the solution of popular housing problems in Mexico.

V. Economy

The Spanish domination did not produce grave disorders in the indigenous communities since the intensive cultivation of the land permitted the introduction of the plow and the innovation of Western-type harvests. Prior to 1910, the material base of the economy was formed by the hacienda, which included agricultural land, water, pastures, forests, quarries, mines, limestone, and other riches, thereby making it self-sufficient and bringing about the monopolization of land to obtain large numbers of cheap and unskilled laborers. It included the *tienda de raya*, a form of company store run by the land owners, a regulation

agency for the payment of the peon, a church and a cemetery, a jail, and sometimes a school. Close to the wall which surrounded the *hacendario* nucleus were the dwellings or huts of the peons.

The redistribution of lands and the institution of the communal farms, initiated with the Revolution, gave way to an incipient industrialization. However, a cultural change has not been produced with the same rapidity as the advanced social transformation. These cultural aspects explain some incongruities which today are displayed in regional ecological integration. In some zones the cooperative farmers and indigenous Indians persist in primitive means of agriculture, leaving unused the arable lands or simply employing them as pastures (1).

VI. Trends of the National Economy

During the last 20 years the gross national product has tripled, but in the same period the national per capita production has increased less because of the accelerated demographic growth (Table 1).

TABLE 1
GROSS NATIONAL PRODUCT

YEAR	GROSS PRODUCT (Millions of Pesos)	POPULATION (Millions of Inhabitants)	PER CAPITA PRODUCTION (Pesos)
1940	20,721	19,791	1,609
1960	67,000	34,923	1,918

Source: Bank of Mexico, S.A.

The participation of diverse economic activities within national production from 1940 to 1957 did not register any fundamental changes, as may be seen in Table 2. It is important to note that in the last few years mining has lost importance and the petroleum industry has increased; farming activities are represented by only 22 per cent of the national product although they absorb 53 per cent of the work force; and lastly, the manufacturing industry has increased its share in the total production of goods and services (6).

VII. Education

Eleven-Year Plan

The Mexican government has established a plan whose fundamental goal is to diminish to a great extent illiteracy within a period of eleven years; to give all rural and suburban communities prefabricated school

TABLE 2

RELATIVE PRODUCTIVITY AVERAGE OF WORK FORCE
IN PERCENTAGE OF INTERNAL PRODUCT AND TOTAL OCCUPATION

ACTIVITIES	1940		1957	
	PRODUCT	OCCUPATION	PRODUCT	OCCUPATION
Agriculture	20.5	65.4	22.9	53.6
Mining	4.4	1.5	2.4	0.8
Petroleum	1.7	0.3	3.7	0.4
Manufacturing	16.4	9.0	22.2	12.1
Electric Power	0.6	0.1	1.2	0.3
Construction	1.8	1.8	5.0	3.2
Commerce	25.1	9.3	19.5	8.7
Transportation and Communications	5.8	2.5	4.9	3.5
Banks and Securities	1.3	0.2	0.8	0.4
Private Services	15.4	6.6	14.1	13.6
Government	7.0	3.3	3.3	3.5
Totals	100.0	100.0	100.0	100.0

Source: Ifgenia M. de Navarrete, *The Distribution of Income and the Economic Development of Mexico*.

buildings for primary instruction; to provide free books and notebooks; to increase the number of openings for teachers; and to raise the level of technical and university teaching by the creation of specialized centers in the most important populated areas of the country.

Illiteracy and Language

In 1930 illiteracy in the population six years of age or over was 67 per cent; in 1940, 59 per cent; in 1950, 44 per cent; and in 1964 it was estimated at 27 per cent.

Not taking into consideration persons under five years of age, 88 per cent speak Spanish; 7 per cent Spanish and indigenous tongues; and 3 per cent indigenous dialects only. In comparing this last percentage with that of 1940 it is noted that the monolingualistic population of Indian dialects has decreased to almost half (2).

Free Textbooks Distributed

In 1960, 15,492,198 free books and workbooks were distributed; in 1964, the number was 24,754,090. The total number distributed in the period 1960-64 was 107,155,755 (5).

Elementary Teaching

The number of elementary schools and the percentage of school-age children attending compared to 20 years ago is shown in Table 3.

TABLE 3

ELEMENTARY SCHOOLS

YEAR	NUMBER		PERCENTAGE OF CHILDREN ATTENDING
	URBAN	RURAL	
1940	4,684	16,953	45
1960	7,284	25,611	63

General Culture (4).

Some significant facts concerning general cultural trends are shown in Tables 4, 5, and 6.

VIII. Health and Welfare

Specific campaigns have been carried out, the most important ones dealing with malaria, typhus, diarrhea, tuberculosis, leprosy, oncocercosis, pintodisease, poliomyelitis, goiter, venereal diseases, vaccination against smallpox, whooping cough, diphtheria, and tetanus, as well as campaigns relating to hygienic education and, just recently, regarding nutritional education concerning supplementary diets for preschool children and pregnant women.

There are more than 2,000 sanitary offices and health centers, and more than 3,000 hospital centers (official and private) which serve large

TABLE 4

PROFESSIONAL TITLES ISSUED IN THE COUNTRY

PROFESSION	1948	1961
Humanities	1	31
Technical professions	566	1,680
Social professions	265	604
Administrative professions	2,957	10,911
Medical auxiliary professions	1,054	1,893
General instruction	989	2,457

TABLE 5

NEWSPAPERS AND MAGAZINES REGISTERED PERIODICALLY

	1953	1960
Daily	131	197
Weekly	296	378
Biweekly	94	545
Monthly	545	856
Others	184	234

TABLE 6
RADIO AND TELEVISION STATIONS

	1953	1961
Commercial radio stations	240	399
Cultural radio stations	6	16
Television transmitters	6	22

areas of the cities and which are penetrating rural regions. Although facilities are still insufficient, they are on an acceptable scale as can be seen in Table 7.

In recent years efforts in sanitation have emphasized the realization of integral programs coordinating sanitary action with assistance and field personnel who at any moment may undertake both functions, without neglecting the training of highly skilled and specialized personnel.

Until recently, the integral programs were basically concerned with coordination of preventive and curative medicine, and rehabilitation and investigation.

As this action penetrated, in an organized manner, the rural environment by means of the institutional structure, the need was observed for considering within the sanitary programs action for socioeconomic betterment, chiefly in the rural areas, so that it can now be stated that the sanitary districts' integral programs include plans for rural socioeconomic betterment, whose principal objective is to organize the communities and prepare voluntary auxiliaries. The main objective of the cooperative and national programs of rural community development is to use the unoccupied and semioccupied work force in the rural areas, thus converting these people into productive human beings, giving them buying power to free themselves from their misery and thereby making them free men. Up to the present, this program has organized more than 1,000 projects of various types in the country; sanitation, recreation, education, and agriculture and livestock promotion.

TABLE 7
SANITARY SERVICES 1930-1960 (6)

SERVICES	1930	1960
Hospital centers	496	3,384
Hospital beds	7,214	69,250
Number of doctors	4,317	24,600
Assistance to interns	90,525	532,407
Assistance to nonresidents	4,700,000	47,235,619
Immunizations	870,000	11,629,584
Clinical examinations	65,287	1,007,568

The response has been so great that after one year of working with this type of program, the Ministry of Health and Welfare has used the experience gained to organize a National Program of Rural Community Development, which was begun in September of 1964. This program functions under the Ministry of Health, and 150 million pesos has been allocated for the distribution of national products.

Table 8 presents a resumé of the results obtained by the program; and Table 9 lists the projects terminated or in process up to July 31, 1964.

TABLE 8
COOPERATIVE PROGRAM FOR RURAL COMMUNITY DEVELOPMENT
(August 1, 1963, to July 31, 1964)

Work terminated and in process	1,218
Total cost of projects	\$50,417,780
Rations authorized	2,579,181
Rations distributed	1,111,959
Economic allocations authorized	922,923
Voluntary workers	44,356

TABLE 9
PROJECTS TERMINATED OR IN PROCESS

Environmental sanitation	263
Agriculture and livestock promotion	143
Education, recreation facilities, village beautification	452
Communications	241
Small industry and commerce	6
Miscellaneous public services	113
Total	1,218

Finally, Table 10 presents comparative data on public health to illustrate the influence of the sanitary organizations in matters relating to health (6).

TABLE 10
LIFE EXPECTANCY AND MORTALITY RATES

YEAR	LIFE EXPECTANCY AT BIRTH	INFANT MORTALITY RATE PER 10,000 BORN ALIVE	GENERAL MORTALITY RATE PER 10,000 INHABITANTS
1930	26.5	131.6	26.6
1962	62.0	67.4	10.4

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Arthur W. Peterson: MAN-LAND RELATIONS IN THE
CARIBBEAN REGION

MY PERSONAL EXPERIENCES in the study and observation of land and land use in the Caribbean region are limited to four countries during the period 1950-1953: Costa Rica, El Salvador, Cuba, and Haiti. In El Salvador and Costa Rica I helped make Agricultural Region maps and became familiar with general relationships of land to people. In Costa Rica, I cooperated with Ralph Loomis of the Food and Agricultural Organization of the United Nations in a study of the management of individual farms and the land use of the Reventazón River watershed.* Later, in this paper, I shall use data from the Costa Rican studies to illustrate land and people relationships.

The Artibonite Valley of Haiti was studied intensively by representatives of various international agencies in the early 1950's. A rural sociologist of Michigan State University and I spent a short time reviewing engineering, agricultural, and sociological studies of the proposed project for this fertile valley. We concluded, in a report to the Inter-American Institute of Agricultural Sciences, that the most limiting factors in the possible success of this project were cultural. The land and water resources appeared good to excellent. I have not visited the project since 1952 and did not find specific references to it in the literature.

Cuba, where I spent about six months in 1953, has the best over-all agricultural resources of any country in the Caribbean region. My per-

*From July, 1950, to September, 1953, I was Land Use Economist, Inter-American Institute of Agricultural Sciences, Organization of American States, Turrialba, Costa Rica. I was stationed at Turrialba for one year; at San José, Costa Rica, for about one and one-half years; and in Havana, Cuba, for six months.

sonal experience was in a demonstration area of a regional training project of the Technical Cooperation Program of the Organization of the American States. This demonstration area was about 50 miles east of Havana and bordered a large sugar cane region. Most of the farms were family-operated and grew sugar cane, tobacco, and miscellaneous crops. One area we classified as a dairy region. The data gathered in a farm management study and by personal observation indicated that the economic development of that part of Cuba was the highest I had seen in Latin America. A few families had already installed TV sets by 1953.*

I. General Land Use Characteristics and Agricultural Production Trends

The following quotation describing agricultural land use in Mexico, Central America, and the Caribbean Islands comes from a publication of the United States Department of Agriculture.

Mexico

Mexico has an immense territory in the northern part of the country that is arid, and without adequate irrigation it is unproductive. In fact, about 33 per cent of Mexico's land is considered unproductive. The mountains in northern Mexico are rugged; some are of relatively recent volcanic origin, and sufficient soil has not formed to support vegetation even if there was adequate rainfall.

About 34 per cent of Mexico's land is considered to have sufficient soil and precipitation for pasturage of some kind; 20 per cent is forested; 9 per cent is cultivated; and only 4 per cent is reported as potential productive land. The land in Mexico having the greatest productive capacity for commercial agricultural commodities lies in the great Central Plateau, where the soil is fertile and the altitude is suitable for temperate climate crops and comfortable human habitation.

Central America

The productive agricultural area of Central America lies in the highlands near the west coast, except for the extensive banana plantation in the coastal area on the Gulf of Mexico. As in Mexico, about 9 per cent of the total area of Central America is in cultivation. In some individual countries, however, the percentage is much higher. Central America has sufficient annual rainfall for crop production, but the uneven seasonal distribution is a great disadvantage in many areas.

About 52 per cent of the land in Central America is forested, and from it comes a great variety of forest products. Some of the finest mahogany comes from Honduras, for example. About 10 per cent of the

*During the three years I made official visits for the Inter-American Institute of Agricultural Sciences to all countries in Latin America except Paraguay and Venezuela.

land of Central America is in pasture; 15 per cent is potential productive land; and about 14 per cent is unproductive.

Central America, with its variation in physical features, can qualify as both a temperate and tropical area. Its high plateaus provide pleasant habitation for man and vegetation, and its lowlands are suitable for tropical products.

The Caribbean Islands

The land in the densely populated Caribbean Islands is utilized for the production of agricultural commodities to a much greater extent than is that in continental Latin America. About 17 per cent of the land of the Caribbean is cultivated; 26 per cent is in pasture land; 27 per cent, forested; 5 per cent, potentially productive; and 25 per cent, unproductive.

Sugar production occupies the largest part of the cultivated land. However, the islands produce a wide variety of tropical products in their relatively small area, for their elevation ranges all the way from 5,000 feet to a few feet above sea level. Most of the islands lie in the path of the hurricanes and suffer periodically from severe damage to the crops.¹

There are wide variations in the land characteristics of the Caribbean. With the exception of Cuba, the percentage of land that can be cultivated or pastured is low, relative to most areas of the world. Some of the characteristics of the land that limit its intensity of use are:

1. Steepness of slope or shallowness of soil mantle.
2. Poor drainage of many areas at low elevations.
3. Low productivity because of leaching and rapid decomposition of organic matter in humid, subtropical areas.
4. Low rainfall.
5. Small size of countries and small size of regions with similar physical land features. The development of efficient agricultural services and processing and marketing industries is difficult because of the small volume of production available in one place. For example, the development of a seed industry to provide hybrid corn requires a relatively large corn region with similar climatic characteristics.

It seems probable that the author of *Man, Land and Food* is correct when he writes:

Thus far, efforts have been concentrated in correcting minor defects to render the existing land supply productive. Some land has such serious defects as to make efforts to make it productive too costly to consider. Much of the earth's land surface falls into this category. It is too cold, too steep, lacking in the basic nutrients, or too dry and too far from an adequate water source to permit irrigation. As capital becomes

more plentiful, as cheaper sources of energy are developed, and as more effective, efficient means of converting sea water to fresh water become available, considerable land may be added to that currently under cultivation. At this time, it seems that little additional land, by nature well suited for cultivation, is available. Any substantial additions to the currently cultivated area must await the investment of human effort and capital, in irrigation, drainage, or other land improvement.²

Income and Arable Land Per Person

A figure prepared by the Economic Research Service of the U.S. Department of Agriculture and published in their recent publication, *How The United States Improved Its Agriculture* (page 26), allows us to compare the relative position of most of the countries in which we are interested with the other countries of the world, on the basis of income and arable land per person. Three countries, Haiti, Jamaica, and Puerto Rico, included in our study area, have less than one-half an acre of arable land per person. Of these three countries, Haiti is the only one which also has an income of less than \$200 per person annually. Little relationship between the income per person and the arable land per person is indicated.

Trends in Agricultural and Food Production

Indices of total agricultural and food production by countries and per capita are published in the *Regional and World Agricultural Situation Reports* of the U.S. Department of Agriculture, Tables 1, 2, 3, and 4.³

The base years for this comparison are the crop years 1952-53 to 1954-55, inclusive. I am impressed by the difference in rates of growth of the total agricultural production among countries of the Caribbean region. Haiti is the only country that did not show an increase in total agricultural production from the base period of 1960, although Jamaica made relatively slow progress. Cuba kept pace with the other countries until 1961-62, but from that time forward, total agricultural production in Cuba has decreased rapidly. Three countries—El Salvador, Guatemala, and Nicaragua—have almost doubled their total agricultural production since the base period and Mexico has increased production by over two-thirds. The rates of growth per capita, however, are much lower because of the rapid increase in population growth.

Population growth rates in Latin America, as reported in the publication, *Man, Land and Food*, have been consistently higher than any other geographic region of the world. The total population of Latin America has increased threefold since 1900 and projections forecast a ninefold increase during this century.⁴

TABLE 1

CARIBBEAN, CENTRAL AMERICA, AND MEXICO: INDICES OF TOTAL AGRICULTURAL PRODUCTION BY COUNTRY, 1958/59 THROUGH 1963/64¹
(1952/53 - 1954/55 = 100)

COUNTRY	1958/59	1959/60	1960/61	1961/62	1962/63	1963/64
Caribbean Countries:						
Cuba	122	123	133	101	84	77
Dominican Republic	136	135	138	142	137	141
Haiti	94	109	93	108	105	94
Jamaica	104	114	116	116	126	125
Trinidad and Tobago	104	120	131	112	125	126
Average	112	120	122	115	115	112
Central American Countries:						
Panama	123	126	112	124	124	130
Costa Rica	118	117	131	129	134	137
Honduras	125	125	128	138	143	147
El Salvador	134	127	136	167	180	198
Guatemala	125	131	135	151	175	189
Nicaragua	140	121	134	165	186	193
Average	127	124	129	145	157	165
Mexico	147	145	150	156	166	171

1. Adapted from Table 1, *The 1964 Western Hemisphere Agricultural Situation*.

The Caribbean area has kept pace in population with the rest of Latin America. When I was in Costa Rica, a little over ten years ago, the annual rate of population increase was over 3 per cent. It is now estimated to be near 4 per cent.⁵

It is not surprising, therefore, that agricultural production per capita has a much slower rate of increase than total agricultural production (Table 1 compared with Table 2). Several countries actually show a decline below the base period. Cuba, with an index one-half that of 1960-61, shows the largest decrease, followed by Haiti. Trinidad and Tobago, Panama, Costa Rica, Honduras, the Dominican Republic, and Jamaica, are all approximately the same as the base period. The four countries—El Salvador, Guatemala, Nicaragua, and Mexico—show important increases in their agricultural production per capita.*

*Farming is a biological industry that requires great flexibility in management when bad weather, insects, and diseases strike. Usually, also a farm operation requires a relatively large area per worker and supervision of several workers per manager is difficult. Monoculture (one crop farming) lends itself to large-scale farming better than areas where several crops are grown on the same farm simultaneously or in rotation. The family-operated, but not necessarily family-owned farms, usually are more efficient in countries with educated farm operators. Communal and large state-owned farms have been notable for their failures, not their successes.

TABLE 2

WESTERN HEMISPHERE: INDICES OF TOTAL AGRICULTURAL PRODUCTION PER CAPITA, BY COUNTRY, 1958/59 THROUGH 1963/64¹
(1952/53 - 1954/55 = 100)

COUNTRY	1958/59	1959/60	1960/61	1961/62	1962/63	1963/64
Caribbean Countries:						
Cuba	110	109	115	86	69	63
Dominican Republic	114	110	109	108	101	100
Haiti	85	96	80	92	87	76
Jamaica	98	106	106	105	112	111
Trinidad and Tobago	90	101	107	88	95	94
Average	99	104	103	95	92	88
Central American Countries:						
Panama	106	106	91	98	95	97
Costa Rica	98	93	100	95	95	93
Honduras	108	104	103	109	109	109
El Salvador	117	108	112	135	141	151
Guatemala	108	110	110	119	135	141
Nicaragua	119	99	106	126	137	138
Average	109	103	103	113	118	121
Mexico	127	121	121	123	127	127

1. Adapted from Table 2, *The 1964 Western Hemisphere Agricultural Situation*.

Why these differences in rate of growth of agricultural production per capita? In some cases, like Cuba, the answer seems simple. But why has Haiti had such an alarming decrease in its agricultural production per person? Why have several other countries barely held their own?

The charts showing indices of food production in total and per capita are similar to those showing total agricultural production.⁶ It seems significant, however, that most of the increased agricultural production for the Dominican Republic, Haiti, Jamaica, Trinidad and Tobago, Panama, Costa Rica, and Honduras was due to an increase in food production. The countries of El Salvador, Guatemala, and Nicaragua, on the other hand, reflect a slower growth in food production than in the over-all index of agricultural production. In El Salvador, food production has not kept pace with population. This suggests that the agricultural growth rate per capita in these countries is a result of growth in production of nonfood commodities. It appears from the data that Mexico has had a parallel growth in total agricultural production and food production per capita.

Table 5 shows the population growth in the countries under study and the per capita food availability for the period of 1956-58 and 1959-61.⁷ Haiti and the Dominican Republic show the poorest food

TABLE 3

LATIN AMERICA: INDICES OF FOOD PRODUCTION, 1958/59 THROUGH 1963/64¹ (1952/53 - 1954/55 = 100)

COUNTRY	1958/59	1959/60	1960/61	1961/62	1962/63	1963/64
Caribbean Countries:						
Cuba	122	123	133	100	83	76
Dominican Republic	142	139	142	143	138	142
Haiti	100	106	114	107	108	89
Jamaica	104	115	118	117	126	126
Trinidad and Tobago	103	120	131	111	123	124
Average	114	120	127	115	115	111
Central American Countries:						
Panama	125	129	114	125	127	132
Costa Rica	107	105	113	138	142	148
Honduras	125	126	133	138	142	148
El Salvador	95	98	101	99	117	117
Guatemala	116	119	122	127	133	135
Nicaragua	130	135	141	150	156	154
Average	116	118	120	125	132	135
Mexico	146	156	153	162	168	186

1. Adapted from Table 3, *The 1964 Western Hemisphere Agricultural Situation*.

situation per capita, followed closely by Guatemala and El Salvador. Panama, Trinidad and Tobago, and Jamaica fall in the middle group with Cuba, Mexico, and Costa Rica at a relatively high level. It is probable that the per capita food availability in Cuba has fallen drastically since 1958.

Before discussing the characteristics of land that influence its use, let me turn your attention to an additional piece of historical evidence about agricultural development in the Caribbean region.

Indices of the economic development of agriculture in the Caribbean region from before World War II to about ten years after its close are shown in Table 6.⁸ The base years, 1935-39, represent a depression period in the economic life of the Western Hemisphere. The years 1955-56 and 1956-57 are at the end of an inflationary period caused by World War II and the Korean War. Because most countries of the region under study export agricultural products as raw materials, or at the most as semiprocessed products, the agricultural price level fluctuates widely and follows the world level of raw material prices.

Purchased items of farm and family living costs, on the other hand, respond more slowly to world price levels, and may continue to move in an opposite direction from raw material prices for a considerable period of time, as they have done since the end of the Korean War. This is

TABLE 4

LATIN AMERICA: INDICES OF FOOD PRODUCTION PER CAPITA, 1958/59
THROUGH 1963/64¹ (1952/53 - 1954/55 = 100)

COUNTRY	1958/59	1959/60	1960/61	1961/62	1962/63	1963/64
Caribbean Countries:						
Cuba	110	109	115	85	69	62
Dominican Republic	119	113	112	108	101	101
Haiti	90	93	98	91	89	72
Jamaica	98	106	108	105	112	112
Trinidad and Tobago	89	101	107	87	94	93
Average	101	104	108	95	93	88
Central American Countries:						
Panama	108	108	93	99	98	99
Costa Rica	88	83	86	82	87	86
Honduras	108	105	107	109	108	110
El Salvador	83	83	83	80	91	89
Guatemala	100	100	99	100	102	101
Nicaragua	110	111	111	115	115	110
Average	99	98	96	97	100	99
Mexico	126	130	123	128	128	138

1. Adapted from Table 4, *The 1964 Western Hemisphere Agricultural Situation*.

because the products which represent cash costs to farmers of the Caribbean, as well as the United States, are influenced greatly by "prices" of taxes, depreciation, interest, and urban wage rates of the industrialized sectors of their own or other countries.

Commercial agricultural production in the Caribbean was stimulated by the period of inflation during World War II and the Korean War just as it had been depressed by the unfavorable price relationships of the 1930's. Table 6 shows the influence of a favorable price period on commercial agriculture in the Caribbean Region. In contrast, Tables 1, 2, 3, and 4 represent a period of relatively unfavorable prices for raw materials when compared with "farm costs." Agricultural development in total and per capita occurred at a rapid pace in Cuba, Costa Rica, El Salvador, Nicaragua, and Mexico during the 20-year period from 1935-39 to 1955-57 (Table 6). In Honduras, Haiti, and the Dominican Republic, the total volume of agricultural production increased about 50 per cent, apparently at about the same rate as the increase in population.

Let me summarize:

1. The countries of the Caribbean produce mostly raw materials for world trade.
2. Prices received by farmers in commercial agriculture are greatly influenced by world price trends of raw materials.

TABLE 5

WESTERN HEMISPHERE: POPULATION AND FOOD AVAILABILITY PER CAPITA, AVERAGE 1956-58 AND 1959-61, AND SELECTED YEARS¹

COUNTRY	POPULATION				PER CAPITA FOOD AVAILABILITY	
	Average 1956-58	Average 1959-61	1962	1963	Average 1956-58	Average 1959-61
Caribbean Countries:	(1,000)	(1,000)	(1,000)	(1,000)	calories	calories
Cuba	6,389	6,797	7,086	7,242	2,910	2,730
Dominican Republic	2,719	3,015	3,228	3,341	1,960	1,930
Haiti	3,904	4,161	4,340	4,433	1,870	1,780
Jamaica	1,559	1,619	1,661	1,682	2,190	2,260
Trinidad and Tobago	778	850	902	929	2,390	2,470
Central American Countries:						
Costa Rica	1,048	1,176	1,269	1,319	2,570	2,480
Honduras	1,690	1,849	1,963	2,023	2,190	2,330
El Salvador	2,245	2,435	2,570	2,641	2,190	2,000
Guatemala	3,448	3,768	3,980	4,103	2,080	2,010
Nicaragua	1,333	1,476	1,578	1,631	2,330	2,190
Panama	983	1,073	1,138	1,172	2,380	2,370
Mexico	31,893	34,934	37,108	38,251	2,480	2,580

1. Adapted from Table 5, *The 1964 Western Hemisphere Agricultural Situation*.

TABLE 6

INDEX OF VOLUME OF AGRICULTURAL AND LIVESTOCK PRODUCTION
IN LATIN AMERICA, BY COUNTRY, 1955-56 AND 1956-57¹
(1935-39 = 100)

COUNTRY	TOTAL		PER CAPITA	
	1955-56	1956-57	1955-56	1956-57
Caribbean Countries:				
Cuba	172	197	115	129
Dominican Republic	150	169	96	107
Haiti	150	124	116	95
Central American Countries:				
Costa Rica	208	233	128	137
El Salvador	180	198	133	144
Guatemala	158	168	108	112
Honduras	158	147	92	83
Nicaragua	334	365	234	248
Panama	189	192	121	120
Mexico	258	250	157	148

1. *Agricultural Geography of Latin America*, p. 3, para. 8, Table 1.

3. Prices paid by commercial farmers are greatly influenced by the fixed costs of manufacturing, transportation and government.

4. Periods of "worldwide" inflation are generally favorable for raw material producers, like farmers, and periods of deflation are unfavorable.

5. Most farmers in the Caribbean region, especially producers of commercial crops, enjoyed a favorable price relationship from the beginning of World War II until the end of the Korean War.*

6. Since 1953, raw material prices, including agricultural prices, have been stable or have decreased while prices paid by farmers have risen. Net incomes of most farmers in the Caribbean area and the United States have decreased since 1953 unless farmers have been able to offset the unfavorable price relationships by increased volume of production per person.

7. Economic growth has been relatively slow since about 1954 in countries where the economy has an agricultural base, as in the Caribbean region.

8. The future agricultural development of the Caribbean region will be greatly influenced by those external forces which determine the direction of the world price level for raw materials and its relationship with prices of finished goods which farmers buy.

II. Characteristics of Land That Influence Its Use and Agricultural Development

The characteristics of land and man have been classified in many different ways in attempts to understand land use and its relationship to the well-being of people. Four broad groupings have been helpful to me. Two of these, cultural and institutional, are related to the human resource side of the equation and two to the land side. Let me illustrate the first approach I have found useful in an economic classification system of the land resources.

Characteristics of Land

It is possible to interpret and classify the physical features of land from two viewpoints that have social and economic implications. These are:

*The Wholesale Price Index, which is usually used to indicate changes in the value of money, is no longer a satisfactory measure of inflation or deflation of the value of the "farmers' dollar." This is because wholesale prices reflect a larger and larger percentage of fixed costs like depreciation, taxes, interest, and industrial wage rates in their structure.

1. How many people are supported per unit of land? This involves outlining broad geographic areas within the same country and cultural setting into agricultural regions. An agricultural region is defined as a geographic area of land with similar population density patterns of the rural population.

2. How well are people supported? This involves identifying smaller geographic areas within the same agricultural region which are similar in their productive capacity per acre. It follows, therefore, that these "economic land classes" differ from each other within an agricultural region in their capacity to profitably repay expenses per acre, including management and risk.

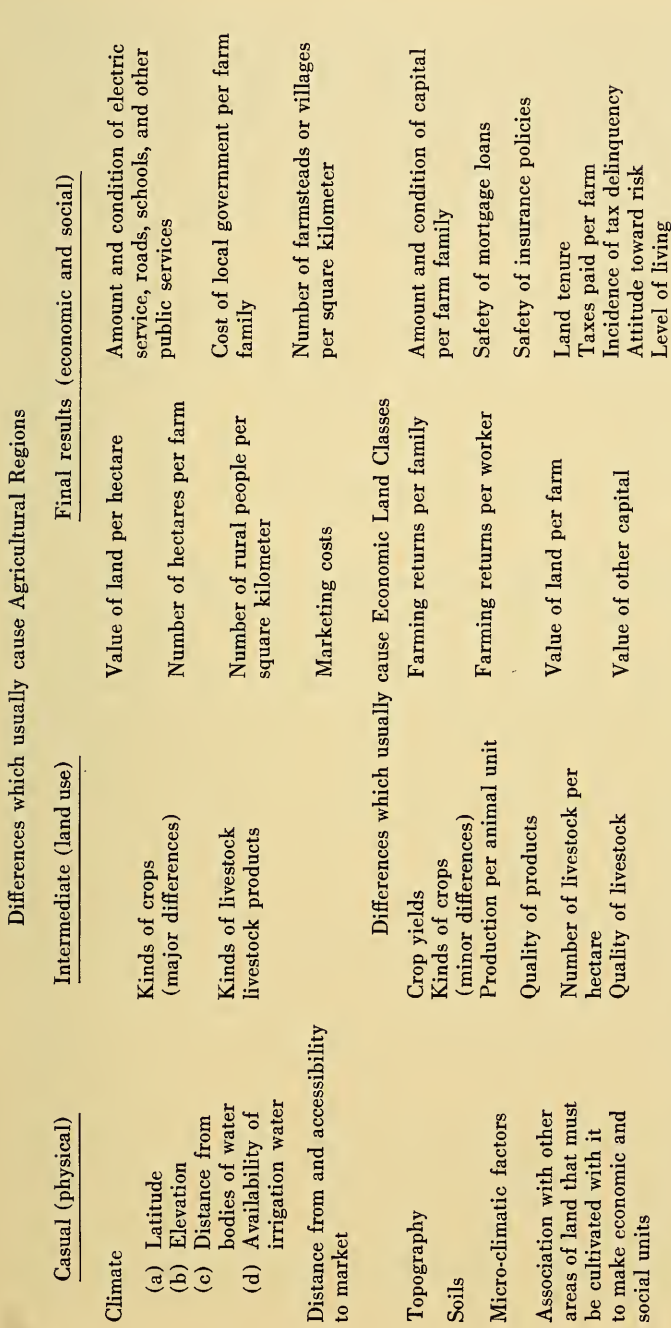
The production curve per acre as it responds to increasing inputs of expense units per acre differs from one economic land class to another in much the same way that the production curves differ for dairy cows with variations in inherent capacity to produce milk.

The available net income per farm family for family labor and management varies by economic land class. Economic land classes are, therefore, related to those economic and social results which are caused by differences in income per family.

Figure 1 diagrams the relationships between physical land characteristics to land use and the welfare of rural people, that have been found in many studies in the United States and Canada. Dr. A. B. Lewis, who did the original research work at Cornell University in the early 1930's has made similar studies in mainland China, Puerto Rico, Guatemala, and other countries.⁹ I have helped conduct studies of this type in Costa Rica, Cuba, and Taiwan, and in the states of Nebraska and Washington.

Professor Isowo Iwakata of Kyushu University, Japan, and his students have made several studies in southern Japan using basically this method of land classification.¹⁰ Dr. Shison C. Lee and his students have continued the work started in Taichung Hsien and City, in 1960.¹¹ They have classified about one-third of the Province of Taiwan and made over 2,000 farm family business interviews as a part of these studies.

This method of classifying land is described in *Studying Land Use in Costa Rica: Applicability of the Method to Other Regions*, which was published by the Inter-American Institute of Agricultural Sciences, Turrialba, Costa Rica, in January, 1953.¹² In this publication, agricultural regions are defined as follows: "In order to make useful recommendations regarding adjustment in land use, it is necessary to study and evaluate the relationships between physical land factors, land use, and the welfare of people. Some land factors, such as climate, geological soil factors, and distance to market, tend to be regional in their influence. These land characteristics which usually determine the general land-use



The fundamental factors of soil, climate, topography, distance from markets and relation to other areas of land influence every economic feature of the life of an agricultural area. Changes in climate and distance from markets usually cause differences in Agricultural Regions; changes in soils or topography usually cause differences in Economic Land Classes.

Figure 1. Factors Related to the Intensity of Use to which an Area of Land is Adapted

pattern of a broad region, also are associated with the capacity of land to support people per unit of area. Usually differences in land-use patterns between regions are accompanied by differences in the area of land a farm family can operate. The most important regional differences in land characteristics, therefore, affect not only the land-use pattern but also the number of manzanas (area) per person or per rural family. Using this concept, agricultural regions can be defined as broad areas of land which have similar land-use patterns and densities of rural populations."

Economic land use classes are defined as follows: "Within agricultural regions land varies by areas in its capacity to pay the expenses of operating a farm unit and to provide an acceptable level of living for the farm family relative to the standard of the culture. These land areas, of differing economic productivity within agricultural regions, are called economic land use classes. Usually five or more different economic land use classes can be identified and mapped within a single agricultural region."

Dr. Quentin West and I prepared an agricultural region map of Costa Rica using the method of land classification previously described.¹³ We adjusted the "natural" boundaries to the 1950 census segment boundaries so that the census data could be summarized by agricultural regions. The Department of Statistics and Census in the Ministry of Economics summarized the 1950 census by regions as well as by provinces. Table 7 indicates the wide variation in manzanas (a manzana is about 1.7 acres of land) per person and per family by agricultural regions of Costa Rica. Tables 8 and 9 reflect the land use patterns by agricultural regions as summarized from 1950 census data.

As indicated earlier, Ralph Loomis and I, assisted by Carlos M. Castillo, Pónfilo Rodríguez, and others, prepared an economic land use class map of the Reventazón River Watershed near Cartago, Costa Rica. Table 10 shows income, expense and capital investment differences for family farms by economic land use classes within the dairy and coffee-cane regions of the Upper Reventazón River Watershed.¹⁴ As the economic productivity increased from low to very good (measured by economic land class) the man equivalents, gross and net earnings per farm, farm expenses, and capital investment per farm increased from 3 to 4 times. The farm earnings and expenses tended to be a little higher in the coffee-cane region than in the dairy region but the capital per farm, as estimated by farmers, was about the same in the two regions.

Similar studies in Taiwan in 1960-61 reflected relationships between land and people similar to those found in Costa Rica ten years earlier.

TABLE 7

MANZANAS PER PERSON, PERSONS AND MANZANAS PER RURAL FAMILY, FAMILIES PER FARM AND VARIATION IN MANZANAS PER PERSON, AGRICULTURAL REGIONS, COSTA RICA, 1950

REGIONS ¹	PER PERSON (AVERAGE)	PERSONS PER FAMILY ²	MANZANAS PER FAMILY	FAMILIES PER FARM
Coffee	0.8	5.9	4.7	2.7
Cane	1.5	5.9	8.8	2.1
Coffee-General	1.8	5.7	10.3	1.9
Coffee-Cane	2.2	6.0	13.2	3.6
North Dairy	2.3	6.0	13.8	2.5
Banana	2.9	5.2	15.1	5.6
Cacao-Banana	4.0	4.6	18.4	4.3
Grain	3.7	6.0	22.2	2.2
South Dairy	4.6	6.0	27.6	2.6
Grain-Livestock	5.8	5.6	32.5	1.5
Livestock-Grain	7.9	6.1	48.2	1.6
Intensive Livestock	8.5	6.5	55.2	1.9
General Farming	10.7	5.4	57.8	1.8
Extensive Livestock	59.4	6.7	398.0	1.2

1. Regions are listed in order of intensity of use as determined by the number of manzanas per family in each region. 2. Average of cantons in each region.

Taiwan is more densely populated than Costa Rica and is about ten degrees farther north. There are, however, many similarities in the natural flora of these two parts of the world, and in their commercial agricultural crops. Tables 11, 12, and 13 show relationships of farm receipts, farm expenses, and the calculated amount available for investment or debt retirement per family farm by economic land class and size of farm in the rice region. In the rice region of Taiwan even the "large farms" are "small" in area, usually less than five acres per farm family. Most Chinese farmers and their families make an acceptable level of living (based upon their standards of living), pay their farm expenses, and accumulate capital. Farms in land of marginal productivity, or of small size ($1\frac{1}{3}$ acres or less), are usually exceptions to this general rule of "adequate income," and family workers on these farms seek off-farm jobs.

The approximately 70,000 farms in Taichung Hsien and City were estimated to have accumulated about \$5 million U.S., which was available for investment or debt retirement. This estimate is based upon 1960 production data gathered by a farm management survey taken in 1961 stratified by economic land classes. This favorable economic situation for most Taiwanese farmers is reflected in the rapid agricultural growth rates of Taiwan since World War II.¹⁵

TABLE 8

RANKING OF CROPS BY NUMBER OF MANZANAS
IN EACH AGRICULTURAL REGION, COSTA RICA, 1950

Regions	Crops					Per Cent of Cultivated Cropland					
	First	Second	Third	Fourth	Fifth	First	Second	Third	Fourth	Fifth	Total
Coffee-Cane	Coffee	Corn	Cane	Beans	Tobacco	74.7	8.1	8.0	5.9	1.9	98.6
	Cane	Coffee	Corn	Beans	Tobacco	37.7	26.8	15.0	14.4	2.2	96.1
	Coffee-General	Corn	Beans	Cane	Rice	27.8	24.4	17.0	6.9	3.6	79.7
	Coffee-Cane	Cane	Cut	Beans	Corn	52.3	21.0	6.1	3.4	3.1	85.9
North Dairy	Coffee	Corn	Pasture	Cut	Potatoes	25.6	22.0	12.3	8.1	6.7	74.7
			Cane	Pasture							
Banana	Bananas	Rice	Corn	Cacao	Plantains	61.2	7.4	6.1	3.3	3.8	81.8
	Cacao-Banana	Bananas	Corn	Coconuts	Yuca	42.6	14.7	6.7	2.4	0.8	67.2
Grain	Corn	Rice	Beans	Plantains	Coffee	22.2	16.1	11.8	4.0	3.6	57.7
	Coffee	Corn	Cut	Beans	Cane	20.7	16.9	9.1	7.7	1.9	56.3
South Dairy			Pasture								
Grain-Livestock	Corn	Beans	Rice	Cane	Bananas	24.1	13.1	9.7	4.4	4.1	55.4
	Bananas	Corn	Beans	Rice	Cacao	14.9	12.6	10.6	8.5	8.0	54.6
Intensive Livestock											
General Farming	Corn	Rice	Beans	Plantains	Bananas	20.9	10.1	4.7	3.3	1.3	40.3
	Corn	Bananas	Rice	Beans	Cane	19.6	10.4	8.1	4.0	3.8	45.9
Extensive Livestock	Corn	Beans	Rice	Plantains	Bananas	8.5	6.5	5.3	2.0	1.3	23.6
Country	Corn	Coffee	Beans	Bananas	Rice	16.0	13.7	7.7	7.6	6.6	51.6

TABLE 9

NUMBER OF LIVESTOCK PER FARM BY AGRICULTURAL REGIONS
COSTA RICA, 1950

REGIONS	CATTLE ¹	OXEN ²	MILK COWS ³	HORSES AND MULES ²	SWINE ⁴	SHEEP AND GOATS ⁴	CHICK- ENS ²
Coffee	2.8	0.7	3.3	0.4	0.7	0.07	16.7
Cane	3.4	1.2	3.6	0.7	0.8	0.03	20.7
Coffee-General	3.8	0.8	3.4	0.7	1.6	0.01	22.1
Coffee-Cane	6.9	1.8	7.2	1.5	0.8	0.01	14.0
North Dairy	8.6	1.2	9.4	0.9	0.7	0.08	16.1
Banana	7.9	0.1	6.5	4.7	4.3	.....	24.8
Cacao-Banana	10.1	0.5	7.2	2.0	1.9	0.03	16.2
Grain	14.4	1.2	10.2	2.4	3.9	0.07	27.7
South Dairy	12.4	1.4	14.0	0.9	1.0	0.20	18.0
Grain-Livestock	7.0	0.6	6.6	1.5	3.3	.....	25.9
Livestock-Grain	18.7	0.8	9.9	2.3	4.7	0.03	18.6
Intensive Livestock	31.0	1.4	18.6	5.5	6.9	0.09	23.8
General Farming	11.4	0.6	7.8	2.1	8.1	0.08	24.8
Extensive Livestock	58.9	1.3	35.3	10.3	6.1	0.04	20.0
Total	12.6	1.0	9.4	2.0	3.3	0.05	21.5

1. Per farm having any cattle.

2. Per farm; total in region.

3. Per farm having milk cows.

4. Per farm having livestock (except poultry).

III. Characteristics of Man That Influence Land Use and Agricultural Development

Having looked at some characteristics of land that influence land use and agricultural development, I now turn to cultural characteristics of man and his institutions that seem to be important factors.

Cultural Characteristics

After my experiences in Latin America, and again in Taiwan ten years later, I am convinced that cultural factors are among the most basic influences on man-land relationships. In a memorandum of June 24, 1963, to the Director of Agricultural Experiment Stations, Washington State University, I expressed it this way: "My hypothesis is that economic development is basically dependent on the values and beliefs of a social group of people. I would suggest that we try to design a study of values and beliefs held by rural people, and then explore the possibility of relationships with economic development. In order to do this, we would have to make comparisons among countries, cultures. . . . It would be necessary to decide on a set of beliefs, or values that we

TABLE 10

GROSS FARM EARNINGS, FARM EXPENSES, NET FARM EARNINGS, AND
CAPITAL INVESTED PER FARM, 132 FAMILY FARMS, BY
REGION AND LAND CLASS, UPPER REVENTAZON
RIVER WATERSHED, COSTA RICA, 1952¹

ECONOMIC LAND CLASS	NUMBER OF FARMS	NUMBER OF MAN EQUIVALENTS	GROSS EARNINGS PER FARM ²	EXPENSES PER FARM ³	NET FARM EARNINGS PER FARM ⁴	CAPITAL PER FARM
Dairy Region						
			¢	¢	¢	¢
Low	8	1.4	3,507	1,788	1,719	8,500
Fair	10	1.7	5,383	2,700	2,683	22,800
Average	10	1.9	5,818	2,450	3,368	30,600
Good	17	3.1	12,100	6,182	5,918	47,724
Very good	20	2.7	14,441	6,480	7,961	69,190
Coffee-Cane Region						
Low	8	2.2	5,126	2,588	2,538	14,012
Fair	15	2.5	7,636	4,012	3,624	21,456
Average	19	2.5	8,147	3,426	4,721	29,268
Good	11	3.1	13,428	5,366	8,062	40,464
Very good	13	3.3	16,776	7,215	9,561	62,223

1. A family farm was defined as having the equivalent in family and hired labor of not less than 0.7 and not more than 8.0 man "years" equivalent. The monetary unit is a colón, equal to about 15 cents U.S. in 1951-52.

2. Includes the estimated value of products produced on the farm and consumed by the farm family and hired workers.

3. Includes a charge for all labor except the operator.

4. Returns to operator for labor, management, and capital.

hypothesize might be important, both those that might encourage and those that might inhibit economic development. It would then be necessary to try to state these in such a way that rural people could indicate whether they held such beliefs or not."

Members of other social science disciplines, particularly anthropologists, have made many studies of the influence of culture of land-man relations. Nevertheless, Arthur Niehoff and J. Charnel Anderson made the following observation:

In Human Behavior Studies the area of the dynamics of culture change has been largely neglected. Social scientists in the past, particularly anthropologists, have tended to study human groups from a static point of view. That is, specific changes were identified and described but the process by which they had taken place was not known to the researchers. It is our contention that if enough data, based on actual field studies, can be collected and analyzed, the specific characteristics of this process can be isolated and evaluated. Even more important, a

TABLE 11

GROSS FARM RECEIPTS PER FARM BY ECONOMIC LAND CLASS AND SIZE OF FARM, RICE REGION. DATA FROM THREE FARM MANAGEMENT STUDIES, TAIWAN, 1960-61¹

LAND CLASS AND SIZE	GROSS FARM RECEIPTS			
	TAICHUNG HSIEN AND CITY (N. T. \$)	CHANGHWA AND NANTOU HSIENS (N. T. \$)	FOUR TOWNSHIPS, TAIPEI, AREA (N. T. \$)	AVERAGE OF THREE STUDIES (N. T. \$)
Land Class 1				
Very large	59,085	71,092	69,475	66,551
Large	42,956	36,228	32,548	37,244
Medium	27,302	26,739	25,278	26,440
Small	15,578	13,718	12,751	14,016
Land Class 2				
Very large	51,237	52,699	45,495	49,510
Large	28,348	29,148	25,988	27,828
Medium	19,748	22,057	22,125	21,310
Small	9,843	10,430	6,902	9,058
Land Class 3				
Very large	37,872	41,474	35,122	38,156
Large	21,265	22,516	22,786	22,189
Medium	16,688	14,905	11,686	14,426
Small	11,617	7,340	8,611	9,189

1. Land Class 1 is very good land for rice production in Taiwan. The economic productivity of the land decreases from Land Class 1 to 3.

Farms were classified as to size as follows:

Very large — 1.35 hectares (about 3½ acres) and larger.

Large — 0.95 hectares (about 2⅓ acres) to 1.34 hectares.

Medium — 0.55 hectares (about 1⅓ acres) to 0.94 hectares.

Small — 0.54 hectares (about 1¼ acres) and smaller.

The New Taiwan Dollar was officially exchanged at 40 N. T. to 1 W. S.

The black market rate was about 45 to 1.

recurring pattern of the most important characteristics should emerge and a general theory of the change process could be formulated.¹⁶

In the Caribbean area there are important differences in land use caused by the influences of culture; for example, the African culture in Haiti versus the Spanish culture in Costa Rica, and the Spanish versus the Indian cultures in Central America.

East and West Pakistan have a common religion and national government but different cultural backgrounds. The influence of differences in culture on land use was apparent when I visited Pakistan earlier this year.

One of the best examples of the influence of culture that I have seen was in Malaysia. The Malaysian government is sponsoring new village

settlements in the rubber regions. For political reasons the government finds it necessary to settle families of three different cultural groups (Polynesian, Chinese, and Indian) in each village. The commercial crop of the village is rubber but each family has its own house and plot of land. The houses reflect the cultural differences as do the crops and live-stock raised on the individual plots. A farm management study showed

TABLE 12

FARM EXPENSE PER FARM BY ECONOMIC LAND CLASS AND SIZE OF FARM, RICE REGION. DATA FROM THREE FARM MANAGEMENT STUDIES, TAIWAN, 1960-61

LAND CLASS AND SIZE	FARM EXPENSE			
	TAICHUNG HSIEN AND CITY (N. T. \$)	CHANGHWA AND NANTOU HSIENS (N. T. \$)	FOUR TOWNSHIPS, TAIPEI, AREA (N. T. \$)	AVERAGE OF THREE STUDIES (N. T. \$)
Land Class 1				
Very large	29,920	45,027	42,988	39,312
Large	23,595	24,304	19,808	22,569
Medium	17,830	17,553	18,760	18,048
Small	9,284	10,329	8,245	9,286
Land Class 2				
Very large	29,915	30,190	26,585	28,897
Large	17,253	19,261	20,992	19,169
Medium	13,168	13,509	15,110	13,929
Small	7,571	8,709	6,392	7,557
Land Class 3				
Very large	21,683	26,845	26,387	24,972
Large	18,687	16,532	16,680	17,300
Medium	10,292	10,523	8,233	9,683
Small	8,871	6,858	7,022	7,584

Chinese families making more money than their neighbors, partially because a small hog enterprise for home consumption and sale is traditional in the Chinese culture, but forbidden, or at least not traditional, in the other cultures represented.

Different cultures have developed different formal and informal institutions which reflect the culture. "Institutions" also vary within the same cultural group. Many people have observed the relationship between land use and institutional factors. Some students of land-man relationships have concluded that changing legal institutions such as rights of ownership and use of land is the most important method of improving land use.

TABLE 13

AMOUNT AVAILABLE FOR INVESTMENT OR DEBT RETIREMENT PER
FARM BY ECONOMIC LAND CLASS AND SIZE OF FARM, RICE
REGION. DATA FROM THREE FARM MANAGEMENT
STUDIES, TAIWAN, 1960-61

LAND CLASS AND SIZE	AMOUNT AVAILABLE FOR INVESTMENT OR DEBT RETIREMENT			AVERAGE OF THREE STUDIES (N. T. \$)
	TAICHUNG HSIEN AND CITY (N. T. \$)	CHANGHWA AND NANTOU HSIENS (N. T. \$)	FOUR TOWNSHIPS, TAIPEI AREA (N. T. \$)	
Land Class 1				
Very large	23,842	11,690	24,916	20,149
Large	10,707	2,427	6,116	6,417
Medium	225	2,170	9,387	3,927
Small	1,291	136	447	625
Land Class 2				
Very large	14,099	15,202	6,854	12,052
Large	9,844	5,048	—1,467	4,475
Medium	1,418	2,397	— 357	1,153
Small	—1,955	—1,971	—2,075	—2,000
Land Class 3				
Very large	4,881	12,494	—2,842	4,844
Large	1,146	769	—1,804	37
Medium	1,353	—1,677	— 229	— 184
Small	1,428	—5,063	2	—1,211

Institutional Factors

Agriculture must operate within the framework of legal, commercial, and social institutions, which in turn influence agricultural development. Some of these institutional factors are:

1. Form of government, especially strength of local government units
2. Stability of government
3. Religious institutions
4. Educational institutions
5. Marketing and supplying systems (Cooperative versus other forms of organization)
6. Communication and transportation systems
7. Credit systems
8. Land tenure and inheritance.

Let us now examine these institutional factors:

1. *Form of government*: Cuba illustrates a basic change in philosophy and form of government, and its influence on agricultural development.

Many people were critical of the Cuban government under Batista. Whatever the merits of that criticism, Tables 1 through 4 reflect the serious decline in total and per person production of agriculture in Cuba since 1961. Although other factors were operative, it seems probable that organizing farm production, marketing and supplying businesses into large, government-controlled organizations is conducive to lower agricultural production.

Experience in the USSR with state and collective farms versus production on private plots provides additional evidence that farm families respond to the incentives of individual operation (not necessarily ownership). Data from the United States Department of Agriculture show that about 3.3 per cent of the sown area in Russia is on about 25 million privately-operated plots. This area of 3.3 per cent produces approximately one-third of the total agricultural output in Russia. Further evidence of the influence of this form and philosophy of government on agricultural production can be found in comparing the recent advances in agricultural production in Taiwan versus the mainland of China. In Taiwan, the agricultural production increased about 58 per cent from 1952 to 1962.¹⁷

Comparable statistics for the mainland are difficult to find and more difficult to verify, but Hoang Van Chi, writing in the *China Quarterly*, reports as follows regarding the use of communes in Mainland China: "The Chinese Communist Party admitted, on December 28, 1960, to a vertical drop in food production since 1959, that is to say just one year after the implementation of the commune system. The blame for this was assigned to bad weather and natural calamities, but the remedy prescribed by Mao suggests that this may not have been the truth, or at least not the whole truth."¹⁸

"Local self government," says A. B. Lewis, ". . . is the key to national economic advancement and political stability." He goes on to say: "Economic development depends mainly on the education of the people and on transportation, that is, on schools and roads. For economic development like that of the advanced countries, good elementary schools for all the rural village children are necessary, and there must be roads from the farms to the market towns. In the economically developed countries the structure of government is such that the villages and rural districts can tax their own citizens and provide these services for themselves. On the other hand, in the underdeveloped countries, without exception, the powers of taxation are highly centralized, and villages and rural districts have little or no governmental income of their own. They must always beg for schools and roads from the central authorities, and

the central authorities never have enough money to supply these needs. Rural schools and roads are always few and poor when they are supplied and controlled by the central government. The people of the economically advanced countries were not highly educated nor wealthy when they installed their systems of local self-government. They had no large universities and no scientists. They had no steel mills and no big irrigation dams. Local self-government enabled them to begin to have schools, roads, and canals. It enabled them to understand and use freedom as an instrument of national progress."¹⁹

Costa Rica had one of the more stable governments of Latin America but in 1950 to 1953 it did not have strong local rural government units with the power of taxation. As far as I know, local governments are still weak in Costa Rica, in other Central American countries and in the Caribbean Islands. In contrast, Taiwan (Formosa) has strong county (*Hsien*) and township governments with the power to levy taxes for roads and schools. These local governments provide a help in developing local leaders. A related factor in developing local leaders in Taiwan is the presence of county and township farmers' associations operated by elected boards of directors who hire managers to operate these cooperatives. A corps of educated, experienced local leaders exists throughout Taiwan.

The "basic democracies" of Pakistan are another example of local government units that seem to be developing into viable instruments for economic and agricultural development. The statistics regarding the building and improvement of schools, rural roads, dikes, drainage, and irrigation works at the local level are impressive. In meetings with several of these locally elected "basic democracy" groups of West and East Pakistan, I saw local leadership in action. These leaders had pride in their accomplishments.

2. *Stability of Government*: Agricultural development is associated with capital accumulation and investment of this capital in productive enterprises. It seems to be almost a truism that stable government is essential to economic and agricultural development. Some countries of the Caribbean are seriously handicapped in economic and agricultural development because of a history of unstable central governments.

3. *Religious Institutions*: Religious beliefs and institutions are among the most important influences in agricultural development in my opinion. What a man believes to be true influences his creative capacity and his acceptance of change. Unfortunately, there is little systematic research to support or contradict the opinion I have just stated. As indicated

earlier in this paper, I think it is a serious gap in our knowledge of man-land relationships.

Dr. A. T. Mosher, Director of the Agricultural Development Council, had this to say: "Agricultural development does not depend on farmers and agricultural technicians alone; it is a function of the whole culture, the whole way of life of a people. . . . The group of topics for research mentioned most frequently by correspondents consulted in preparation of this paper consists of questions about the value systems, aspirations, dominant motives of rural people, and of the urban elite of each low-income country. Questions with respect to the attitudes and values of rural people include the following:

(1) Attitudes toward nature in general, and with respect to man's place in the world.

(2) What are the dominant aspirations of farmers? Of rural people generally?

(3) Attitudes with respect to social interaction. Are they individualists? Cooperative? Do they feel that cooperative aid should be limited to kinfolk? Extended to close neighbors? To all members of the village?

(4) Attitudes with respect to family obligation. Do farmers feel free to keep the fruits of increased production for expenditure or for investment, or must they share these with relatives or others in the community?

(5) Attitudes with respect to the proper functions and responsibilities of government.

(6) Attitudes with respect to land and livestock.

(7) How strong is the attachment of rural peoples to particular staple foods in their diet? Does this have realistic significance?"²⁰

4. *Education*: The importance of all kinds of education for rural people as a factor in agricultural development has been recognized by most leaders in both developed and underdeveloped countries. One could raise the question, however, "Has improving education or local government received as much emphasis as land reform by political and intellectual leaders?" Farm management studies have consistently shown a positive relationship between increasing formal education, the acceptance of improved farming practices and crop yields.

Education is also related to the rate of population increase. A recent study in Taiwan showed that education is related to family size. Women between the ages of 35 and 39 who had senior high school education said they had wanted about 3.2 children on the average compared with over 4 children wanted by women without any formal education. The women with a senior high school education had borne about 3.5 children compared with over 5.5 for those women with no formal education. The

levels of education in between the two extremes showed a consistent relationship with both number of children wanted and borne per family. The lower the level of formal schooling, the more children per family. The use of contraceptives was also positively correlated with education.²¹

5. *Marketing and Supplying System*: My personal observation is that it is important to encourage private enterprise and to attract foreign capital into this part of the agricultural industry. Too often, the primary emphasis in the use of scarce capital has been placed upon building up heavy industry subsidized by the central government rather than on encouraging private agricultural production, marketing, and supplying services. The granting of monopolies to government-owned and -operated businesses as so-called cooperatives has been a deterrent rather than a help to agricultural development, in my opinion. Dr. Mosher, in the paper previously quoted, suggests that among the areas of research needed are, "Studies of experience with cooperative societies as agencies for marketing and credit. 'Cooperation' has stood very close to 'land reform' as a slogan and as a panacea for rural ills. Enthusiasm for cooperatives has persisted in many parts of the world despite repeated failures of cooperative enterprises. The magic of the slogan is so strong that the name cooperative is applied to types of organization making no recognizable application of the classical principles of the Rochdale society of weavers from which the modern Cooperative Movement sprang. Meanwhile, the problems which cooperative societies are expected to solve are real, and they are of major importance to agricultural development. It is obvious that some type or types of effective organization through which the marketable produce of millions of small farms can move to market and through which production credit and requisites can be made available to these many small farmers is essential. And there are examples of successful cooperative societies on a wide scale, notably in Japan and Taiwan, keeping the hope alive that such societies may serve these functions elsewhere. What is needed is careful multi-country studies of various types of organizations called 'cooperatives,' of the conditions under which they have arisen, of the problems they have encountered, of the modifications which have been introduced in efforts to solve these problems, of their actual administrative costs (sometimes hidden in general governmental administrative and auditing budgets as well as in public subsidies), and of the ethical and other cultural elements necessary to their success or responsible for their difficulties."²²

6. *Communication and Transportation*: These two institutional factors are related to other factors previously discussed, especially the market-

ing and supplying system. They may be covered in other papers, but I want to recognize in passing that good communications and transportation systems are vital to modern agriculture and that they should be developed in relation to agricultural regions and economic land class areas.

7. *Credit System*: The need for a government-supported agricultural credit system, as a prerequisite to agricultural development, has been overrated, in my opinion. In a developing country where most of the people live in rural areas, agriculture will have to generate most of the investment capital, and unless capital is forcefully siphoned off into non-agricultural industries through taxation, the agricultural industry probably will be serviced better than other industries because rural people will control the "surplus" capital. Rural people are better informed about agriculture than about other industries and should know the risks involved. If interest rates are high in rural areas, you are likely to find comparably high risks.

8. *Land Tenure*: Among agricultural economists and many other social scientists the key to agricultural development has often been sought through land tenure reform. The term "land reform" needs to be distinguished from "agrarian reform." The latter is used when a broad group of institutional changes are considered versus land reform which refers to the narrower field of land tenure.²³

I will limit the discussion in this section of the paper to a consideration of land reform. In reading the literature, I find many hypotheses and theories advanced about the influence of land tenure institutions on agricultural and economic development but few factual studies. Most relationships of land tenure to agricultural development and production have been accepted as true, without testing the hypotheses. The report of the Latin American USOM's Seminar on Agrarian Reforms, held in Santiago, Chile, February, 1961, is an example of this tendency.²⁴

In general, I hold similar values, especially about family farms, to those expressed by the participants at this seminar. I am concerned, however, by the lack of research to support the conclusions on which land reform programs are promoted. Perhaps I have not searched the literature carefully enough, but I find scientific studies to support the validity of the following assumptions. Sometimes the available evidence suggests a conclusion which is the reverse of the assumption. Let's look at a few of these assumptions.

1. *Ownership of land by individual families is the primary value of rural people in the Caribbean and other underdeveloped regions of the*

world. Most of us accept this assumption as true. We believe "land reform" revolutions to be caused by the landless peasant. Our reasoning sounds logical from our cultural viewpoint and it seems to be accepted by what Dr. Mosher calls the "urban elite" in the underdeveloped countries. But I would like to see this hypothesis tested in relation to other values held by rural people with an indication of priorities.

2. *Land use is better and yields are higher on land that is owned by farmers than it is on land rented by farmers.* The trouble with this hypothesis is that the research evidence available does not support it. Most studies show no statistical differences among tenure groups in crop yields on the same class of land. Moreover, part-owner farms are usually larger than either fully-owned or fully-rented farms and reflect higher production per person. This seems to indicate that renting additional land is an effective way to gain management control over additional resources.

3. *Family farms have better land uses and higher yields than multi-family farms.* The only opportunity I've had to test this hypothesis was in the Meseta Central of Costa Rica in 1950-51. Ralph Loomis and I found no consistent pattern of yield difference between family-sized (0.7 to 8.0 man equivalents) versus multi-family farms (8.0 man equivalents and larger). Loomis reported to the Food and Agricultural Organization, United Nations, as follows: "With the exception of corn yields on family farms in the Dairy Region as compared with multi-family farms, where the yields were higher on the multi-family farms, there was no significant difference in yields of the various crops between the family and multi-family farms."²⁵

4. *Small farms are more intensively used than large farms in the same agricultural region and economic land class.* Studies indicate that this is not true for commercial crops where the yields can be measured. The unused land on large farms may not have the capacity for intensive use, but most researchers do not take time to check variations in land productivity.

5. *Rents are usually too high because the landlords have a better bargaining position than the tenants.* What do you use as a standard to establish that a rental rate is too high?

6. *It is beneficial in underdeveloped countries to allow capital to flow out of agriculture, but it is not beneficial to have nonfarmers' invest in land and fixed capital improvements like irrigation or drainage unless they become owner-operators.* (One could ask, "Why not place restrictions on nonfarm industrial firms and insist that they be family-owned and -operated, also?")

7. *Interest rates are too high and should be lowered* (to approximately what farmers pay in developed countries). Where do we find studies

that have measured risks and customs against which the local members of a culture have established their rates of capital cost?

To me it seems that land reform as a method of agricultural development has been overemphasized relative to other alternatives, including more research. Even the land reform in Taiwan, which has been so widely heralded, has not been subjected to objective, scientific investigation. Yet, it is often held up as a model.

A year ago, when I was in Taiwan for the Lutheran World Relief, I visited several rural Presbyterian churches. Presbyterian church leaders told me that many of their rural congregations had suffered because the land reform had seriously affected the community leadership and support of the rural church. This aspect of the land reform is not widely publicized but, if true, is an important aspect of the result of land reform in Taiwan. Closely related to it and detrimental to agriculture, in my opinion, was the forced flow of capital from agriculture to non-agricultural industries and other investments in Taiwan as a result of land reform. The land reform law provided that land ex-appropriated from landlords should be paid for in rice at the rate of 37.5 per cent of the rice crops over a ten-year period. Previous to land reform, a landlord receiving rent (then usually 50 per cent) would be obligated to pay the real estate taxes and maintain or improve the land and fixed capital attached to it. (By custom, he also had other social obligations in the community, as previously mentioned.) But as a result of the land reform, capital flowed out of agriculture with no compensating inflow. Although agricultural development occurred during this period, it was at a much slower rate than industrial development.

IV. Implications and Conclusion

Cultural and institutional factors may inhibit agricultural development, but they need not prevent it. At least this is the opinion of several agricultural economists who have had wide experience in both the United States and foreign cultures. Recently, in a conversation, Dr. F. F. Hill of the Ford Foundation reminded me of the fact that the recent rapid rate of growth in agricultural production per person in the United States was associated with "big" technological improvements like hybrid corn. He pointed out that prior to 1935, agricultural development in the United States had proceeded at a relatively slow rate. In the late 1930's, a number of revolutionary discoveries changed the curve of production per acre and per animal sharply upward. A table in the publication, *How The United States Improved Its Agriculture*, published

in March, 1964, supports the observations made by Dr. Hill and others.

Dr. Mosher gives Dr. Carl C. Taylor credit for the following statement: “. . . that so-called tradition ridden peasants will not be inhibited by their sanctions and taboos (value systems) if they are approached with alternative ways of doing things which they are already doing, and the doing of which yields them immediate, obvious results.”

The classification of land and land use from an economic viewpoint, as previously described in this paper, provides a basis for further research in farm management and the adaption of farm practices. Dr. W. I. Myers of Cornell University makes this comment: “Another frequent cause of unsatisfactory results from ‘improved’ practices obtained by research in developing countries is due to the failure to try out the new practices in different regions before they are recommended to farmers. A new practice may appear very promising under conditions prevailing in the experimental plots but fails or is less effective in other areas because of differences in soil and climatic conditions. No recommendation of an improved practice can safely be made until it has been thoroughly tested on farms in the principal environmental areas of the country concerned.”²⁶

For implications of “research needed” let me refer you again to the report by Dr. Mosher. The following is a quotation from his paper to which I have previously referred.²⁷

Rural Development and American Culture

The Taylor Hypothesis, in addition to being intrinsically important, provides an easy transition to what may be the most important topic for research considered in this section, if not in all of rural developmental assistance, namely, What is the Relevance to Rural Development of Specific Attitudes and Values Prominent in American Culture?

It may be that, in becoming aware of cultural differences among peoples, and of the multiform influences of aspects of these cultures on rural development, we are in danger of concluding that to get along in their cultures we must master their ways almost to the point of adopting them ourselves.

If attitudes and values are such important determinants of rates of development, why, positively, did rapid rural development begin so much earlier and accelerate so much more rapidly in the United States than in many other places? Americans now going abroad in developmental assistance are the inheritors of those attitudes and values which accelerated this development, and, to greater or lesser degree, they embody them. What is it they have to contribute that is of greatest value? Is it their tractors, their centrifuges, their scientific concepts, the dollars in

their pockets? Or is it their attitude toward nature? Their willingness to risk ridicule in order to try a new method? Their ways of dealing with peers, "superiors," "subordinates" within an organization? Their sense of time as a valuable asset? Their propensity to want to measure with precision? Their literal use of language? Their readiness to classify and generalize? The value they place on formal schooling? Their preference for local over national government? Their willingness to delegate responsibility coupled with distrust of concentrations of power? Their preference for pragmatism instead of for dogma? Their acceptance of some right to equal consideration of all persons? Their concern for the underdog? Their preference of the new to the old?²⁸

Obviously, in any such studies, due consideration must be given to other factors. Certainly America was blessed with abundant natural resources. It could create a new civilization in a new, largely empty land. It did not have to transform an established feudal culture in a crowded land into something different. It was effectively separated from foreign tyrannies. Nevertheless, why was it that thousands left an uncrowded (by any other than American standards) East to line up to dash in to settle Oklahoma, without roads, schools, hospitals, seeds, or credit supplied by "the government," whereas elaborate subsidies seem necessary to get settlers into Mindanao, South Sumatra, eastern Bolivia, southern Venezuela? What was it about the "climate of investment" that brought European capital in large amounts into nineteenth-century America without the guarantees implicit in colonialism? What is it about American culture that impels voluntary private philanthropy into "distressed areas" long before governmental action is even considered?

Perhaps there are two sides to this question of "attitudes and values" in developmental assistance. We have been forced by our experience in low-income countries to recognize that non-economic aspects of culture are powerful forces affecting the rate of development there. Is it not time we really studied the extent to which the non-economic aspects of our own culture have affected our own development? We are in a position now as we have never been before to make such studies, by bringing to them an increasing knowledge of contrasting cultural components in many different settings of resource endowment, population density, and institutional history, around the world. Only when such studies have been made will we be able to answer with assurance the question: What really does America have to contribute via developmental assistance?

In conclusion, man-land relations in the Caribbean region have been and will be influenced by a complex of factors that are not easy to unravel. This paper emphasizes these points:

1. Important breakthroughs in the production of agricultural commodities per acre and per worker are of relatively recent date, even in the United States. Recent studies show that discoveries of improved agri-

cultural practices in the magnitude of hybrid corn may find cultural barriers of adoption much less formidable than previously thought. The basic problem may be to discover agricultural practices which, when used on farms in the less developed countries actually do increase rates of production per acre or per person at a percentage rate similar to recent agricultural practice improvements in the United States.

2. A related problem is to understand the physical and economic characteristics of land in relation to people well enough so that the extension of practices can be specific as to agricultural regions and economic land class areas. This requires also that research results be tested under field conditions in areas selected because of significant differences in physical and economic characteristics.

3. Nevertheless, more thorough studies of the cultural and institutional characteristics and their relationship with land use need to be made to test the validity of political solutions which have been used to reform cultural institutions such as the land tenure systems. These studies may require a multi-country approach.

4. Finally, a more careful analysis of the attributes of our own culture, where agricultural development has been rapid, compared with the characteristics of cultures, where agricultural development has been slow, should be made. Such studies should increase our understanding of man-land relationships.

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28. "This listing is illustrative only; it is in no sense a list of considered hypotheses. It contains items that come easily to the writer's mind to try to make a point: the point that we need to search our own cultural background to try to determine what is pertinent to rate 'development,' and what is not."



Part II

FOOD AND NUTRITION

Hugh C. Miller: FOOD PRODUCTION IN COUNTRIES OF THE CARIBBEAN AREA

I. Introduction

THIS PAPER deals only with a section of the Caribbean area—that section which is served by the Caribbean Organization and includes the three Guianas in South America, the Netherlands Antilles, Jamaica, Puerto Rico, the Virgin Islands of the United States and of Great Britain, and the arc of islands stretching southerly from Anguilla to Tobago and Trinidad a few miles off the coast of Venezuela.

It must be emphasized that the area defined above is one of extreme diversity, showing marked differences in political as well as economic development, with differing social and ethnic patterns, separated by language differences and differing metropolitan associations and reflecting in varying degrees the effects of rapid changes which have been taking place in the region over the last 20 years.

Thus, while Jamaica and Trinidad and Tobago have recently achieved the status of full-fledged sovereign states, and Puerto Rico enjoys a relationship with the United States which is unique in international relationships, eight of the islands of the Eastern Caribbean, the Virgin Islands of the United States and of Great Britain, and British Guiana are still colonies, the Netherlands Antilles and Surinam are overseas partners of the Kingdom of the Netherlands, and the French Antilles and French Guiana are integral parts of France itself.

National incomes per capita range from less than U.S.\$150 in Montserrat, Grenada, and St. Lucia (1959) to over U.S.\$900 in the United States Virgin Islands and in the Netherlands Antilles (1962). Contribu-

tions made by agriculture to the G.D.P. range from 40 per cent in Guadeloupe (1960) to almost nil in the case of the United States Virgin Islands and the Netherlands Antilles, while population intensities range from a density of 1,416 persons per square mile in Barbados to less than one in French Guiana in 1963.

Table 1 indicates the wide range of variation which the data on population densities and national incomes exhibit.

II. General Features of Caribbean Development

Despite these obvious differences, however, the countries of the area all share a limited range of latitude, and are closely linked by geography and a common pattern of historical development and changing fortunes.

Their agricultural development began in earnest with their partition amongst the British, French, and Dutch colonizers, and their fortunes and importance have fluctuated in similar response to the growth and decline of the sugar industry which has dominated the economy of the region over the last 300 years.

During the eighteenth century, the Caribbean islands attained the zenith of their importance as the sugar bowl for Europe; in comparison, the mainland colonies of Middle and North America were important mainly as sources of food supplies for the Caribbean area, and it was the sugar produced in the Caribbean which was largely responsible not only for financing the industrial revolution in Britain but also for providing a basis for the early prosperity of the farmers of the American mainland.

However, a prosperous sugar industry demanded the establishment of large plantations and cheap, abundant labour such as was provided by the slave trade. The nineteenth century saw the abolition of slavery and the development of competitive sugar production in the East where labour was cheaper and more abundant and where new lands assured heavier yields. As a result, Caribbean income from sugar declined rapidly but, though many of the once wealthy Caribbean planters were ruined, the plantation system remained and the sugar industry, bolstered by occasional periods of high prices brought about by international wars or disasters of one kind or another in rival sugar-producing countries, has continued to dominate Caribbean agriculture.

It is true that some attempts at diversification have been made in the area but the production of these new crops was also based on the now accepted plantation system. Moreover, the coffee, cacao, spices and, to a lesser extent, the banana and other enterprises which have subse-

TABLE 1

POPULATION DENSITIES AND NATIONAL INCOMES PER CAPITA IN
19 CARIBBEAN COUNTRIES

	POPULATION DENSITY PER SQUARE MILE	(US\$) NATIONAL INCOME PER CAPITA	YEAR
1. French Guiana	1	300	1963
2. Surinam	5	349	1962
3. British Guiana	7	280	1960
4. The Netherlands Antilles	517	912	1963
5. Jamaica	387	367	1962
6. Puerto Rico	734	736	1962-63
7. The U.S. Virgin Islands	275	1,761	1963
8. British Virgin Islands	136	....	....
9. St. Kitts-Nevis-Anguilla	387	215	1961
10. Montserrat	368	175	1961
11. Antigua	345	237	1961
12. Guadeloupe	432	420	1963
13. Dominica	207	233	1964 (estd.)
14. Martinique	706	420	1963
15. St. Lucia	383	179	1961
16. St. Vincent	568	180	1961
17. Grenada	672	189	1961
18. Barbados	1,416	293	1961
19. Trinidad and Tobago	449	580	1961

Source: Caribbean Plan, Annual Report 1964, Caribbean Organization.

Note: About 88 per cent of the population of the region is concentrated in the mountainous island territories which constitute only 7 per cent of the total land mass in the area.

quently challenged the dominance of the sugar estate have all perpetuated the pattern of using the best available land and other facilities for crops intended for export, forcing the rapidly increasing population in the area to depend on marginal lands, fragmented holdings of uneconomic size, unskilled and part-time local farmers, and especially on imports for supply of their food requirements.

Thus, while traditional export crops have been assured the best lands, the best facilities for financing and marketing and the best available production expertise, very little effort has been made until within recent years to provide any service other than lip service to encourage the production and distribution of food for local use.

While the Caribbean countries were able to maintain a position in which they could dictate the prices for their products and be assured of cheap supplies of food, adherence to such a pattern of production and trade could be justified. However, this period was of relatively short duration. The War of American Independence and the application of

the terms of the British Navigation Act to the new nation served to cut off cheap food supplies from the mainland, and with the development of cane sugar production in other tropical areas and beet sugar in temperate countries the terms of trade for Caribbean countries became steadily more unfavourable.

A similar fate has befallen efforts at developing alternative cash crops such as coffee, cacao, and bananas; and the steady impoverishment of the Caribbean countries which followed was only prevented from causing absolute ruin by the intervention of the metropolitan countries with which they were associated. This took the form of subsidies to the various unit countries and the provision of varying degrees of protection in the markets of Britain, France, the Netherlands, and more recently the United States for products of their respective dependencies.

Similarity of production policies and perpetuation of trading channels between metropolitan countries and their Caribbean dependencies had the effect of isolating individual countries from their neighbours, reducing intra-Caribbean trade to negligible proportions and developing within the area a marked lack of cooperation which was shared not only between countries under different sovereignty but even between countries under the same flag. Even today it is not forgotten that the development of sugar production in Jamaica brought many sugar planters in Barbados to ruin and that later the French Caribbean possessions created similar problems for all the British territories together.

Thus the outbreak of World War II found the Caribbean area a collection of small units, depending heavily on agriculture for their incomes, utilising their resources mainly for the production of export crops, competitive one with the other, and with economies deteriorating steadily as a result of unfavourable terms of trade. Many of the countries had recently experienced grave rioting by sections of their population which had suffered most from the depression, strong national aspirations had been aroused and a militant labour movement had been born.

With the war came recognition of the need for cooperation between the metropolitan countries in promoting the economic improvement of the area, the beginnings of regional and individual country development planning, and keen appreciation that there was urgent need to reduce dependence on outside sources of food. For the first time the Caribbean countries themselves became aware of the advantages to be gained by working closely with their neighbours, by exchanges of experiences and knowledge with other countries in the area, and the possibility of improving their own economic development through projects undertaken on a regional basis.

The Caribbean Commission, which was created as an instrument for fostering this cooperation, was eminently successful in focusing attention upon the basic economic factors which were hampering Caribbean development and pointing to possible solutions. The individual countries moving swiftly towards full responsibility for their own affairs were greatly assisted in their efforts to learn the techniques of economic planning, and a number of countries began to develop manufacturing and other forms of industrial activity. Tourism expanded spectacularly in many countries and, though agriculture remained of basic importance, other sources of national income began to assume noteworthy proportions. These developments varied widely in nature and extent in the several area countries, as did the factors responsible for improvement.

Between 1940 and 1950 the contribution of agriculture to the formation of the national income in the several Caribbean countries ranged generally between 30 and 35 per cent (1).^{*} The 1964 Annual Report of the Caribbean Plan indicates, however, that between 1950 and 1960, the role of manufacturing, mining, and quarrying maintained steady progress while the contribution of agriculture, though showing a slight rise in absolute values, declined appreciably as a percentage of the gross national product, and by 1960 was exceeded by the contribution from mining and manufacturing in the Netherlands Antilles, Surinam, Jamaica, Trinidad and Tobago, British Guiana, Puerto Rico, and the United States Virgin Islands.

For the area as a whole, it may be broadly stated that agriculture (including forestry and fisheries) in 1960 contributed just over 15 per cent, while manufacturing, mining, and quarrying contributed about 30 per cent to the formation of national income.

The fact that these ratios roughly approximate those characteristic of developed countries should not disguise the fact that on the whole national incomes are deplorably low, the standards of living of the masses are distressingly inadequate, undernourishment is widespread, and the rate of increases resulting from agricultural activity is very slow. and higher than the 4.2 per cent recorded for developing countries.

III. Current External Trade of the Caribbean

From an examination of the provisional statistics available for 1963 and presented in Table 2, the following conclusions emerge:

1. The rate of increase of imports between 1962 and 1963 was 6.4 per cent—a rate similar to that achieved by the developed countries

^{*}Italicized numbers in parentheses refer to the numbered items in References on page 87.

2. Over-all Caribbean exports account for nearly 47 per cent and imports for over 62 per cent of the national product. In comparison, exports accounted for 15.4 per cent of the national product in the European Economic Community, 9.1 per cent in Japan, and 3.8 per cent in the United States.

3. The visible trade balance for the Caribbean area shows a deficit of approximately \$560 million, or nearly 16 per cent of the national product. That this is a very high deficit ratio is apparent when it is recalled that in a recent survey carried out by the United Nations the negative trade balance of the developing countries is expected to fall below 7 per cent of the national product by 1970.

This heavy dependence on external trade combined with excessively high deficits in trading balances due largely to the purchase of consumer goods poses a grave threat to the economic security of the region.

It is important, however, to note, that trading deficits are distributed very unevenly among individual countries—those for British Guiana, the Netherlands Antilles, Jamaica, and Trinidad and Tobago were nominal only. In Surinam, the deficit was noteworthy but comparatively modest, while in the French Caribbean Departments and the British Dependencies of the Eastern Caribbean they were comparatively high.

The position of Puerto Rico, which with a deficit of \$315 million accounts for more than 50 per cent of the total area deficit, is a special one in that this deficit is compatible with that country's national product and is completely covered by income derived from tourism and investments from abroad.

Main blame for the undesirable situation in which many of the countries of the area find themselves must be laid on the fact that, in the main, these countries sell goods with a minimum of processing in markets where it is normally the purchasers who dictate prices. At the same time, they buy large quantities of foodstuffs and manufactured goods which incorporate high wages in their value, and for which sale prices are commonly dictated by the seller.

Clearly, if these countries aspire to reduce their dependence on external subsidies, they must not only increase the volume of their exports but must also modify their content and endeavour to develop new trading outlets in addition to existing traditional markets.

IV. The Present Situation in Agriculture

Agriculture is still the largest single employer of labour in all the Caribbean countries excepting the Netherlands Antilles and the United States Virgin Islands. Sugar production with its pattern of seasonal

TABLE 2
IMPORTS - EXPORTS - BALANCE OF TRADE
EXPRESSED IN TERMS OF ABSOLUTE VALUE AND PERCENTAGE OF NATIONAL INCOME OR NATIONAL PRODUCT
In million U.S.\$

COUNTRY	YEAR	TOTAL TRADE	TOTAL IMPORTS	TOTAL EXPORTS	BALANCE OF VISIBLE TRADE	EXPORTS AS A % OF IMPORTS	N. I. OR		EXPORTS AS		IMPORTS AS	
							G. N. P.	A % OF N. I.	G. N. P.	A % OF N. I.	G. N. P.	A % OF N. I.
							ESTIMATED	OR G. N. P.	ESTIMATED	OR G. N. P.	OR G. N. P.	OR G. N. P.
GROUP I												
Netherlands Antilles	1963	1,353.8	695.4	658.4	-37.0	94.7	169.7	388.0	169.7	388.0	409.8	
Surinam	1962	96.6	54.6	42.0	-12.6	76.9	88.0	47.7	88.0	47.7	62.0	
British Guiana	1961	172.5	85.7	86.8	+ 1.1	101.3	156.5	55.5	156.5	55.5	54.8	
Jamaica	1963	429.0	226.0	203.0	-23.0	89.8	620.0	32.7	620.0	32.7	36.5	
Trinidad & Tobago	1963	748.0	375.0	373.0	-2.0	99.5	480.0	77.7	480.0	77.7	78.1	
Puerto Rico	1963	2,005.0	1,159.7	845.3	-314.4	72.9	1,650.2	51.2	1,650.2	51.2	70.3	
U.S. Virgin Islands	1962	81.9	61.8	20.1	-41.7	32.5	66.9	30.0	66.9	30.0	92.4	
Total Group I		4,886.8	2,658.2	2,228.6	-429.6	83.8	3,231.3	69.0	3,231.3	69.0	82.3	
Total Group I ¹		4,804.9	2,596.4	2,208.5	-387.9	85.1	3,164.4	69.7	3,164.4	69.7	82.1	
GROUP II												
French Guiana	1963	12.0	11.3	0.7	-10.6	6.2	9.5	7.4	9.5	7.4	118.9	
Guadeloupe	1963	107.5	69.3	38.2	-31.1	55.1	121.5	31.4	121.5	31.4	57.0	
Martinique	1963	109.4	73.8	35.6	-38.2	48.2	127.8	27.9	127.8	27.9	57.7	
British Virgin Islands	1961	1.5	1.3	0.2	-1.1	15.4	2.0	10.0	15.4	10.0	65.0	
Antigua	1963	17.6	13.4	4.2	-9.2	21.3	12.9	32.6	12.9	32.6	103.9	
Barbados	1963	98.5	57.7	40.8	-16.9	70.7	87.0	46.9	87.0	46.9	66.3	
Dominica	1962	12.0	7.5	4.5	-3.0	60.0	12.2	36.9	12.2	36.9	61.5	
Grenada	1963	13.7	8.6	5.1	-3.5	59.3	16.7	30.5	16.7	30.5	51.5	
Montserrat	1963	1.8	1.6	0.2	-1.4	12.5	2.5	8.0	12.5	8.0	64.0	
St. Kitts-Nevis-Anguilla	1963	12.0	7.2	4.8	-2.4	66.7	12.5	38.4	12.5	38.4	57.6	
St. Lucia	1962	14.3	9.8	4.5	-5.3	45.9	15.4	29.2	15.4	29.2	63.6	
St. Vincent	1962	10.9	7.3	3.6	-3.7	49.3	15.1	23.8	15.1	23.8	48.3	
Total Group II		411.2	268.8	142.4	-126.4	53.0	435.1	32.7	435.1	32.7	61.8	
Total Groups I and II		5,298.0	2,927.0	2,371.0	-556.0	81.0	3,666.4	64.7	3,666.4	64.7	79.8	
Total Groups I and II ²		4,017.6	2,302.9	1,714.7	-588.2	74.4	3,666.4	46.8	3,666.4	46.8	62.8	

1. Excluding U.S. Virgin Islands.

2. Excluding petroleum products, raw materials, and equipment for the Netherlands Antilles.

labour employment is still the most important agricultural activity and utilises more of the best land in the area than any other crop. In the British Windward Islands, the banana has succeeded in ousting sugar, but throughout the area export crops continue to receive greater emphasis than the production of crops for local use. Populations are increasing faster than agricultural income, and the upward trend of trading deficits continues.

The sugar industry finds itself on the horns of a dilemma posed on the one side by the need for mechanization to keep Caribbean production competitive on international markets and, on the other, by dangerously high figures of unemployment prevailing in the area. Similar problems have to be faced by other agricultural industries based on the export trade.

At present, sugar, bananas, coffee, citrus, pineapples, cacao, tobacco, and spices, which constitute the main export crops of the four national groupings represented in the Caribbean, enjoy varying degrees of protection in the markets of the metropolitan countries associated with them. It is however becoming increasingly apparent that such protection will not be extended indefinitely and that more strenuous efforts must be made not only to expand home production of food requirements but also to foster the development of intra-Caribbean trade. This will require co-ordinated planning in order to provide assurance to farmers of a market of substantial dimensions and at the same time to avoid wasteful competition between producing units.

In 1962 the Caribbean countries served by the Caribbean Organization imported from external sources goods totaling \$3,000 million. Of this total, imports of fruits, vegetables, milk, and other animal products were responsible for the expenditure of \$180 million and such imports have been increasing rapidly in volume and in value over recent years. (1). With rising populations, imported standards of living, and expansion of tourism, this trend will continue unless local agriculture can gear itself to meet the demand. Within the Caribbean area there exist conditions which can ensure a year-round supply of fruits, vegetables, and other food crops, as not only do the harvest seasons of many fruit crops vary between countries, but also conditions favourable for production of several vegetable crops occur at varying periods of the year and to varying degrees in the several countries. Some countries are more suited for meat production from goats and sheep, while others are particularly suited for year-round beef production. Other countries have conditions especially favourable for milk production, while intensive poultry and pig production is more suited to some countries than to others. Thus a

sound basis exists for coordinated production planning which will be of great advantage to all the countries of the area.

In the light of these considerations, greatly to be welcomed are a number of recent developments in the area. One of these is the rapid expansion of banana production which has been taking place in the Caribbean over the last 10 years. Apart from its export value and its adaptability for production by small-scale as well as by large plantations, the banana is capable of heavier production of food per unit area of land than most crops with which Caribbean farmers are familiar. Prospects for further expansion of banana production in the area are still most encouraging.

An increase in production of pineapples, citrus fruit, and choice varieties of avocado and mango is another recent and most welcome development. Continued expansion of milk and beef production in Puerto Rico has been a feature of recent years. It is interesting to note that the large sugar-cane industry of that island has now been replaced by the livestock industry as the income earner of first importance.

While the rapid expansion noted in Puerto Rico has not been duplicated in any other countries of the area, several countries and notably Jamaica, Barbados, Surinam, and Martinique have recently taken special measures to promote expansion of milk and meat production.

High per capita consumption of fish has for centuries been a characteristic of the Caribbean countries. During the seventeenth century, cheap supplies of dry, salted, and pickled fish imported from the American mainland formed the main source of protein nutrition for the slaves on the plantations, and this type of fish is still a popular item of the Caribbean diet. Supplies of fresh fish which were once restricted to coastal areas because of lack of refrigeration and transport facilities are now much more widely available; fishing boats in the area have in the main deserted the oar and sail for engine propulsion. Fishermen's co-operatives have been established widely and are helping to facilitate supplies of modern gear and other needs to fishermen.

Large-scale fishing enterprises are now based in Puerto Rico, Trinidad, Barbados, Surinam, and British Guiana, and to a lesser extent in Jamaica, and a promising start has been made with the launching of a Regional Fisheries Project involving exploratory research, training facilities for future fishery officers and for fishermen, and improvement of marketing facilities. This project is being financed jointly by the United Nations Special Fund and the governments of nine Caribbean countries. It is reasonable to hope that these efforts will achieve marked improvement in the supplies of high-quality protein available to the

people of the Caribbean area and in the contribution of the fishing industry to national income.

Food crops and vegetables have been receiving increased attention by many of the governments of the area, as well as by private interests in several countries. Especially noteworthy has been the establishment of government-sponsored marketing corporations in Jamaica and Barbados charged with providing growers of food crops and vegetables with an assured market for their production and thus eliminating a risk factor which had previously served as a difficult obstacle impeding increased production. Food crops are also receiving increased attention at all research stations dealing with crop studies, while there has been some intensification of research involving the introduction and testing of new species of fodder for animal feeding, animal production studies, and research into problems of animal health. Financing assistance through subsidies and credit are also playing an increasingly important role in promoting the production of foods for local consumption.

During 1963 the Caribbean Organization organized a study by a Dutch analyst, Dr. C. N. de Boer, into the possibilities of expanding intra-Caribbean trade in food crops and vegetables.

His report(2) indicates that most of the countries of the area are not producing enough food crops to meet their own requirements and that the major impediments to the expansion of trade in these commodities are lack of production and lack of trading initiative on the part of businessmen in the area. There are no technical reasons why the bulk of Caribbean demands for food crops cannot be produced within the area, but owing to the patterns of trade which have developed traditionally there is widespread lack of information in most countries of the area as to the availability of supplies or the productive capacity of their neighbours in the area.

The decision taken by the Caribbean Organization at its first meeting in September, 1961, to concentrate attention on the problems of expanding intra-Caribbean trade has been fully justified. During the short time it has been in existence the Organization has *inter alia* undertaken studies of the problems of tariff barriers, transport, and telecommunications which are serving to hamper intra-Caribbean trade development, and has established a Clearing House for collection of information on goods in supply or in demand in the several countries served by the Organization, while through the weekly and monthly publications of the Clearing House this information is widely distributed in the area.

All these efforts are being supplemented by the activities of a Caribbean Food Crops Society founded under sponsorship of the Caribbean

Organization in 1963. This Society provides opportunities for exchange of information secured from research, discussions of views and experiences between scientists and others interested in Caribbean food crop production, processing or marketing, and is proving very valuable as a source of technical assistance for support to the efforts of local governments. The Society is most active and is showing a rapid growth in its membership which now has representation of all countries of the area.

Many are the problems still to be investigated and solved. Some co-ordination of production planning is needed to avoid gluts and wasteful duplication, and vigorous promotion efforts are required to help traders to locate markets and sources of supply. Increased technical assistance is needed to provide training for farmers in modern methods of food production and to familiarise them with the special needs and problems of the several new crops which need to be promoted.

Problems of land tenure, oversized and undersized holdings, problems of erosion, the need for more irrigation, more intensive research, more efficient extension work, and for better facilities for credit and marketing; all persist to pose a serious challenge to the determination and initiative of these young developing countries. It is fair to conclude by saying that increased food production in the Caribbean is not only necessary for improvement of the nutrition of the population, but also offers considerable scope for securing marked improvement in the economies of the countries of the area.

Intra-Caribbean trade, as yet representing only 4 per cent of the total trade of the area, seems to offer opportunities for the provision of large and assured outlets for the food producers of the region; it can be rapidly developed by judicious promotion and can serve as a first objective of expanded food production within the area. The first need is for widespread recognition of these facts throughout the region. Once this is secured, we need have no fear that proper action will fail to follow.

V. Acknowledgment

The author is indebted to Mr. Pierre Dervaux, Development Officer of the Economic Division of the Central Secretariat of the Caribbean Organization, for many of the economic analyses presented in this paper and for the tables which have been included.

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C. Richard Arena: FOOD MARKETING AND HEALTH
PROBLEMS IN THE CARIBBEAN: SOME HISTORICAL
OBSERVATIONS

GIVEN THE TIME LIMITS of this discussion, I have decided to focus my attention on the particular Caribbean nation of Mexico. However, because of her rich variety of climatic, geographic, economic, and human elements, Mexico offers a convenient sampling of the entire Caribbean region.

My personal interest in this subject stems from previous land tenure studies and related historical, social, and economic considerations. Neither by training nor experience do I qualify as a "food marketing expert" capable of reporting on the technical aspects of the problem at hand. Latin American historians may recall, as an old illustration of food marketing playing a key political role in the days of *Conquistador* Hernán Cortez, the Aztecs' closing all of their food markets in Tenochtitlán. The immediate result was the thorough defeat of Cortez and his forced retreat from the famous city, only to return with his new Indian allies, enemies of the Aztecs, and achieve ultimate victory one year later.¹

A less bloody connection, possibly, which may be offered as regards food and history in Latin America, is the mere citing of a popular Cuban dish, *moros con cristianos*, or "Moors with Christians." As any black beans with white rice. And the *reconquista* lives again—*¡viva el Cid!*²

In a current children's book on the Ten Commandments I accidentally glanced at the following pertinent statement: "The fifth commandment

obliges us to take proper care of our body by eating nourishing food."³ The more familiar phrasing of this divine law is, of course, "Thou shalt not kill." Could anything express more forcibly the universal importance of the subject of nutrition?

I

The economic habits of the Caribbean nations, like those of all nations everywhere, are firmly rooted in their past history, whether ancient or modern. Understanding the food marketing picture of pre-Columbian Caribbean peoples can give us some useful insights in appreciating existing problems. The large, rambling, and lively market squares so characteristic of Mexican and Guatemalan village communities show how little difference five hundred years can make. In Mexico City itself such great shopping centers represent, with some modification, the direct descendants of those viewed with such profound wonderment by the first Europeans.⁴

Clearly standing apart as the most dynamic period in the history of the food marketing industry is the development that has taken place since World War II, especially in Mexico.⁵ Again turning to this Caribbean country for a closer examination, let us examine the nature of this development in its most salient aspects. These can be divided into three areas: private industry of the small business variety, the larger firms such as the supermarkets, and the state-controlled agencies. It is noteworthy that the rapid and most dramatic changes have been launched in the urban centers. What improvements have been promoted in the poorer, culturally arrested, rural areas have reflected the hand of the state, which has coordinated foreign aid when available.

The small, private food or grocery store commonly found in the United States has never enjoyed equal prestige in Mexico. Nor has it replaced the great *mercados*, or large open market squares. Deceptively similar at first glance to a kind of unfinished supermarket, these consist of great numbers of food merchants paying a kind of rental tax for a fixed place to sell their produce. One beneficial by-product of this system, so apparent in Mexico and Guatemala, is the sociable and neighborly attitude of the buyers and sellers comprising such a market. In the more orthodox ones—where the tourist trails usually end—there exists a positive aversion on the part of the seller to "sell out" early in the day. He does not want to miss the pleasure of socializing while selling; he prefers a gradual depletion of his stocks. The new look in business tactics for the Yankee seems to be coming around to this point

of view also; thanks to the convenience of the American Express Credit Card and the Playboy Bunny Club, he is discovering the delights of mixing business and sociability.

But the most recognizably new feature of the Caribbean shopping world is the *supermercado*. That this latest United States economic innovation has taken hold of the Mexican mind—and peso—was forcibly brought to my attention this past summer while I toiled up the perpendicular streets of Taxco. As you might already know, the Mexican government has passed a decree quick-freezing this picturesque colonial mining town as a permanent tourist attraction. I stopped short to stare at one coming exception to this government policy; for there in the midst of a rubble heap was a sign clearly stating, "On this site a new supermarket will replace the old convent."

Anyone who has ever pushed a cart along the aisles of a big United States supermarket would feel right at home in its Mexican counterpart. In Mexico City these giant shopping centers have at least one enviable convenience denied the tired Philadelphia shopper—they are open on Sunday mornings for last-minute needs.

Actually, they represent considerably more than the coming of a new technique of food and merchandise marketing; for United States brand names and near-exact similarity in packaging are evident everywhere in the stacked shelves. The Kellogg and Campbell labels,⁶ for example, prove that something is being added to the Mexican diet. The phrase "*hecho en México*" (made in Mexico) indicates that the advance of industrialization, so earnestly being encouraged by the national government, is now entering a new area with fantastic potential—food processing and packaging.

II

Still another basic catalytic agent in the postwar food marketing industry in Mexico is the hand of the state. Located in its own building not far from the National Palace is the *Compañía Nacional de Subsistencias Populares, S.A.*, or La Conasupo, as it is more familiarly known to Mexicans.⁷ Relatively new, this ever-expanding organization was founded by presidential order of López Mateos on March 2, 1961, with a *capital social* of one million pesos. It lists four basic objectives: (1) to protect and improve the farmers' income by means of guaranteeing farm prices; (2) to assure national consumers' needs by adequate reserves of corn, wheat, beans, and rice; (3) to regulate the prices of basic items in the consumers' market; and (4) to sell those foods which promote the people's nutrition.⁸

The producers of the national staples of corn, wheat, beans, and rice now find their best customer to be La Conasupo. The price paid the producers is based on the cost of living, taking into account the minimum wage law of industrial workers. The same organization also stores the surplus farm products; at the present time there are some 286 reception centers throughout the corn-producing regions of the nation.⁹ As the nation's labor force is made up of 50 per cent who are farmers, whose share of the national income amounts to approximately 20 to 23 per cent, the economic power of La Conasupo to promote their welfare is incalculable.¹⁰

Even more striking, however, is the role being played by this organization in the sale and distribution of these same basic food products which it also processes. An ever-expanding fleet of trailer trucks conveys the widest assortment of foodstuffs in attractive packages—all containing an amount selling for one peso, or eight cents. There are presently 58 such trucks that are markets on wheels, which the buying public is allowed to enter and make selections from the attractively arranged items. Of the total number of such rolling markets at least six contain other essentials, such as clothing and work shoes. The statistics are staggering: the units cover 1,600 kilometers daily and visit 246 working-class districts; transporting a total of 150 tons of food which is distributed among 2,200,000 inhabitants in the Federal District. They serve the public every day except on Thursday, which is devoted to checking and repairing the equipment used in the operations.¹¹

III

Out-and-out charity programs to the many poverty-stricken families in Mexico are considered taboo in Mexican government circles. The present policy is to avoid a "something-for-nothing" complex among the poor, including the very young. Needy children must pay for prepared school meals by a token amount; their parents may obtain this money through labor around the food preparation centers. This is especially true where the INPI (National Institute for the Protection of Children) is concerned. A great deal of United States surplus food stockpiles reaches the Mexican needy persons in this fashion.

In his indispensable study on the subsistence-level inhabitants of México, Alfonso Caso, the Director of the Instituto Nacional Indigenista, reports on the dire plight of some three million Mexicans "outside of the commercial economy" of the country. They consume what they produce.¹² To the food-marketing industry this constitutes the lack of a

market of considerable proportions. The impact of postwar industrial development so urgently being pushed by the government on all fronts hardly touches any but the urban areas.

The rapid incorporation of modern industrial methods in Mexico's food-marketing sector involves much more than the mere mechanical multiplication of packaged foodstuffs;¹³ it is leading to the rise of entirely new tastes and demands on the part of the buying public. In addition to appearances of "Super Automatic Tortilla Making Shops," for example, new Campbell soup plants have been constructed to foster and satisfy these demands.

IV

A continuing problem for Mexican health authorities, in which the total industrial food-producing and marketing sector is equally interested, centers around the matter of public taste. Supplementing the daily diet of excessively starchy foods of maize and beans consumed by most Mexicans is a must if the nation's basic resource—its people—is to be cultivated. La Conasupo, for example, attempts to achieve this objective by experimenting with new blends in the flour content of bread. Making the food shopper aware of vitamins, as well as the presence of free toys inside, is a still growing accomplishment of the Kellogg breakfast cereal producers of Mexico.

Still another leading industry of Mexico having a profound effect upon the food-buying habits of the nation is tourism. No less a distinguished person than former President Miguel Alemán is the present head of the nation's drive to promote its success. The task of feeding a large number of tourists is big business, especially since they spend weeks at a time in the country. And when selecting their foods, these visitors, the greatest number of which are from the United States, are notoriously uncooperative where the rule of "When in Rome" is concerned. This is especially true with children's tastes. The menus of the shiny new motels along Mexico's excellent highways reflect this situation. What concerns us, however, is the fact that these taste habits have a way of rubbing off permanently on the inhabitants of the host country. Hot dogs ready-to-eat or ready-wrapped in glistening cellophane are in Mexico to stay. So are hamburgers; so are pizza pies and frozen raviolis, whose probable introduction came by John Smith rather than by Giovanni from Italy.

Whereas Mexicans and North Americans might not always agree on their international politics, there seems to be ever-increasing agreement where their taste buds are concerned. In these times we must hang on to those things which bring us together, even if it is only a piece of pizza.

NOTES

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4. Parkes, *op. cit.*, p. 21.
5. "Distribution of Foodstuffs in Mexico City," *Review of the Economic Situation of Mexico* (a monthly review published by the Banco Nacional de México, S.A., Isabel la Católica 44, Mexico, D.F.), XXIX, 454 (September, 1963), 9-10.
6. For an interesting account of the new Campbell plant in Mexico, see "Saludos Campbell's de México," *Harvest* (published by Campbell Soup Company, Camden 1, N. J.) (March-April, 1963), pp. 2-11.
7. For a brief history of this building see Arq. Jorge L. Medellín, *Nuestra Casa de Trabajo, Historia y Leyenda* (Mexico, 1962).
8. Compañía Nacional de Subsistencias Populares, S.A., *Maíz, Cosecha, 1963-64* (Mexico, 1964), p. 22.
9. Mexico City, *La Voz de la Calle*, No. 292—Suplemento del 15 de septiembre de 1963, p. 6. This entire issue is devoted to the operations of La Conasupo.
10. *Maíz, Cosecha, 1963-64*, p. 22.
11. *La Voz de la Calle*, p. 6.
12. Alfonso Caso, *Indigenismo* (Mexico, 1958), p. 39. Especially useful on the contrast between modern and "remote" Mexico is Howard F. Cline's *Mexico, Revolution to Evolution, 1940-1960* (New York, 1962), pp. 110-112.
13. On the development of the canning industry see "Food Canning," *Review*, Banco Nacional, XXXIX, 446 (January, 1963), 12-14.

Part III

SANITATION

Carlos J. Hilburg: WATER AND SEWAGE PROBLEMS
IN THE CARIBBEAN

I. Water and Health

ONE OF THE MOST PRESSING health problems in the developing countries of the Caribbean is the status of the water supply and its sub-product, sewage. From a health point of view, it is of utmost importance as a potential carrier of contamination, especially with human wastes, originating the water-borne diseases such as the typhoid and paratyphoid fevers, amebic dysentery, and others. But there is another group of diseases which are not usually water-borne, but whose pathogenic organisms are controlled mainly by dilution of the contamination, by the use of plenty of water in personal and domestic cleanliness. These are the diarrheal diseases whose transmission from the sick person to the well is done mainly through food and hands contaminated with human wastes.

In a report on Health Conditions in the Americas prepared by the Pan American Health Organization, it is shown in Table 1 that the gastritis, enteritis, and related diseases group was the leading cause of death in 10 countries and territories of the Caribbean of the 28 which reported. In 25 of these countries this group of diseases was ranked among the six principal causes of death. The death rate per 100,000 population varies from 4.4 (United States) to 233.2 (Guatemala), and there are 12 countries and territories whose rates are over 100.0. The percentage of total deaths varies from 0.5 (United States) to 19.4 (Dominican Republic) and in 14 of them it accounts for over 10 per cent of the deaths.

TABLE 1

DEATHS FROM GASTRITIS, ENTERITIS, AND RELATED DISEASES, WITH
DEATH RATES PER 100,000 POPULATION IN
THE CARIBBEAN, RECENT YEARS

	YEAR	NUMBER OF DEATHS	RATE	PER CENT OF TOTAL DEATHS	RANK ORDER
Latin American Caribbean Countries					
Colombia	1959	18,373	132.9	10.4	1
Costa Rica	1960	1,408	120.2	14.0	1
Cuba	1959	2,887	43.3	6.6	3
Dominican Republic	1959	5,862	202.6	19.4	1
El Salvador	1960	1,714	65.6	6.0	2
Guatemala	1959	8,518	233.2	13.5	1
Haiti	1959	507	....	6.3	2
Honduras	1959	468	24.8	2.6	6
Mexico	1960	59,553	170.5	14.5	1
Nicaragua	1960	1,482	100.3	12.4	1
Panama	1960	688	65.2	8.2	1
Venezuela	1960	4,468	62.2	8.1	3
Other Caribbean Countries and Territories					
Jamaica	1956	574	37.3	3.9	6
Trinidad and Tobago	1960	475	57.0	7.2	5
United States	1959	7,780	4.4	0.5	23
British Honduras	1960	103	113.2	15.4	1
Guadeloupe	1960	211	....	10.7	2
Martinique	1960	149	....	11.7	3
Netherlands Antilles	1959	11	5.9	1.1	11
Puerto Rico	1959	1,003	43.2	6.3	4
Virgin Islands (UK)	1960	2	28.6	3.0	7
Virgin Island (US)	1959	13	41.9	4.1	6
West Indies					
Antigua	1960	75	136.4	14.0	1
Barbados	1960	96	41.2	4.5	6
Grenada	1960	164	184.3	16.0	1
Montserrat	1960	18	150.0	12.8	3
St. Kitts-Nevis-Anguilla	1959	79	141.1	11.8	2
St. Luica	1960	166	193.0	13.0	2

Source: Summary of four-year reports on health conditions in the Americas 1957-1960, *Scientific Publications No. 64*, Pan American Health Organization, July, 1962.

It is of particular interest to analyze the impact of these diseases on the 1-4 year age group. Thirteen countries reported the causes of death in this age group according to Table 2. Eleven ranked the gastritis, enteritis, and related diseases group as the leading cause of death; one ranked it as the third cause and another (United States) as the fifth. In all thirteen countries it was ranked among the first five principal causes of death. Excluding United States and Honduras, from 16 to 33

per cent of the deaths in this age group were caused by these diseases.

Table 3 shows that the deaths from gastritis, enteritis, and related diseases occur mainly in the age group under 5 years. In almost all of the reporting countries, over 80 per cent of the total deaths due to gastritis, enteritis, and related diseases occur in the children under 5 years of age.

According to PAHO, mortality in early childhood (1-4 years) can be reduced to very low rates of about 100 per 100,000 population, and this reduction has been demonstrated in several countries. In childhood, as

TABLE 2

DEATHS FROM GASTRITIS, ENTERITIS, AND RELATED DISEASES IN
THE AGE PERIOD 1-4 YEARS, WITH RATES PER 100,000
POPULATION IN THE CARIBBEAN, RECENT YEARS

COUNTRY	YEAR	NUMBER OF		RATE(a)	PER CENT(b)	RANK ORDER
		DEATHS				
Colombia	1959	6,776	376.2	20.6	1	
Costa Rica	1959	304	211.1	24.9	1	
Dominican Republic	1959	1,683	417.6	29.7	1	
El Salvador	1958	1,499	518.7	19.5	1	
Guatemala	1959	3,292	685.8	21.4	1	
Honduras	1958	250	113.6	5.4	3	
Mexico	1958	25,375	640.0	33.2	1	
Nicaragua	1959	436	252.0	22.4	1	
Panama	1959	251	191.6	17.2	1	
United States	1959	543	3.4	3.2	5	
Venezuela	1959	1,166	127.3	16.3	1	
Puerto Rico	1958	221	71.8	22.1	1	
Trinidad and Tobago	1959	104	95.4	28.9	1	

Source: Summary of four-year reports on health conditions in the Americas 1957-1960, *Scientific Publications No. 64*, Pan American Health Organization, July, 1962.

(a) Per 100,000 population.

(b) Per cent of total deaths in the age period 1-4 years.

in the postneonatal period, unfavorable environmental conditions result in high morbidity and mortality rates. Analysis of causes of mortality serves to point out which activities may accomplish the greatest reduction in morbidity and mortality and decrease child mortality by one-half in accordance with the Charter of Punta del Este. One of the goals of the Alliance for Progress is to reduce the present mortality of children under 5 years by at least 50 per cent in the present decade.

If it is known that from 16 to 30 per cent of the mortality of children under 5 years is due to the gastritis and enteritis group, it is obvious that the simple provision of water easily available and in adequate qual-

ity and quantity may reduce these rates closer to the ones obtained in other countries properly supplied with water.

In summary, from a health and sanitation point of view, water is of the greatest importance, both in its quality and in its quantity. The provision of water services within the premises is the most effective way to prevent these diseases. While in developed countries a piped supply of wholesome water is enjoyed by almost everyone, it can safely be stated that in the countries and territories of the Caribbean probably as many as 50 per cent of the population have either inadequate piped water services or are being supplied with unsafe water.

TABLE 3

DEATHS FROM GASTRITIS, ENTERITIS, AND RELATED DISEASES AT ALL AGES AND UNDER 5 YEARS OF AGE IN COUNTRIES OF THE CARIBBEAN, RECENT YEARS

COUNTRY	YEAR	NUMBER OF DEATHS		PER CENT UNDER 5 YEARS
		ALL AGES	UNDER 5 YEARS	
Colombia	1959	18,373	16,753	91.2
Costa Rica	1959	1,384	1,270	91.8
Dominican Republic	1959	5,862	5,556	84.8
El Salvador	1958	4,106	3,507	85.4
Guatemala	1959	8,518	5,558	65.3
Honduras	1958	634	508	80.1
Mexico	1958	64,351	50,227	78.1
Nicaragua	1959	1,458	1,443	99.0
Panama	1959	752	694	92.3
United States	1959	7,780	3,098	39.8
Venezuela	1959	4,585	4,218	92.0

Source: Summary of four-year reports on health conditions in the Americas 1957-1960, *Scientific Publications No. 64*, Pan American Health Organization, July, 1962.

II. Water Supply and Economic Development

Sound water supply is considered by the economists as a basic supporting service since the development in other fields depends on the availability of it. The industries cannot establish themselves without water and, of special interest to the Caribbean countries and territories, the existence of a good water supply is a cornerstone for the promotion and development of the tourist industry, so important in this area.

Water is of extreme importance as a basic resource for industrial activities in the economic development of a country. It is also important

in protecting the manpower, since as a result of the reduction in the incidence of water-borne and water-controlled diseases, more children reach adulthood and fewer man-hours are lost. The economists have established that development depends on (a) the availability of resources and (b) manpower; both of them closely linked with the water supplies, as explained above.

In the case of the Latin American countries, this was recognized in the document Alliance for Progress (1961), where having in mind the relationship between health, economic development, standard of living, and well-being, it was recommended that the Latin American governments carry out projects to provide water and sewerage to at least 70 per cent of the urban population and 50 per cent of the rural population in the decade that began in 1961.

III. Water Needs and Population Growth

In most of the developing countries, the construction of water services is not keeping pace with the population growth and as a result the gap is widening. On the other hand, there is a definite tendency of the population to migrate to the cities, increasing the impact of urbanization. While world population increased at a rate of 1.7 per cent annually from 1950 to 1959, population growth in developing countries expanded at an annual rate of 2.4 per cent, i.e., almost 40 per cent faster than the world population. The growth rate for the Caribbean is one of the highest in the world, estimated at an annual geometric growth of 4.1 per cent, over 140 per cent faster than the world population. The present rate of worldwide urban growth is near 3.0 per cent, i.e., about $2\frac{1}{2}$ times higher than the rural world population growth rate.

The Caribbean countries have devoted considerable effort to the provision of water to the urban areas. Nevertheless, this has not been enough and, as a result, the percentage of population with adequate water service has remained stagnant, if not decreased. A good illustration of this situation is what happened in Venezuela up to 1960. The problems created by growth and urbanization can be readily seen in the following increase in population in 17 years (Table 4).

Thus, in spite of the work of the Instituto Nacional de Obras Sanitarias, created in 1943 and in charge of water supplies in cities of 5,000 inhabitants and over, the rapid increase in urban population resulted in an increase in deficit of water service. Fortunately, during the last four years INOS has developed a stronger waterworks construction program and this situation has been changed notably.

IV. Social Implications of a Water Supply

The provision of water is a sure sign of the raising of living standards. It contributes to the people's well being and, when associated with adequate housing, it promotes gracious living. It allows women and children to devote to other activities the time spent monotonously day in and day out carrying water as they must when none is readily available. It is estimated that a single one-inch pipe carries, without human intervention, as much water as 150 women working 8 hours a day.

TABLE 4
GROWTH AND URBANIZATION IN VENEZUELA
1943 - 1960

YEAR	CITIES WITH OVER 5,000 POPULATION	TOTAL URBAN POPULATION		
		Total	With Water Service	Without Water Service
1943	39	983,000	404,000	579,000
1960	157	4,371,000	2,382,000	1,989,000

V. The Water Situation in Figures

According to Table 5, in 1962 there were 34.6 million people living in urban areas of Latin American countries in the Caribbean who were provided with water of some kind, out of a total urban population of 40.3 million. Nevertheless, only 23.6 million (59 per cent) were with house connections. This situation contrasts very sharply with other countries and territories of the Caribbean that are providing 98-100 per cent house connections.

In rural areas the situation is very discouraging especially in the Caribbean Latin American countries where only 14 per cent of the population is provided with water, usually from public taps, as shown in Table 6. There are 37.8 million people to be supplied. In the other countries the situation is much better with 58 per cent of the rural population supplied, mainly by public standpipes. There are 1.7 million people who have to be supplied, and adding a portion of those already supplied by public taps, the total for these countries should amount to about 3.0 million needing water.

This difference in water services between the Caribbean Latin American and non-Latin American countries is clearly reflected in the mortality rates due to gastritis, enteritis, and related diseases, which may be seen

in Tables 1 and 2. However, the difference is not as substantial as could be expected, due perhaps to the fact that a large proportion of the supply in the non-Latin American group is provided through public standpipes, which from a public health point of view is an intermediate solution only.

VI. The Sewage Situation in Figures

The Charter of Punta del Este included goals at the same level for sewage disposal as for water supplies, that is, to make available sewerage facilities for 70 per cent of the urban population and 50 per cent of the rural. The solution of this problem in Latin America presents greater difficulties than that of water supply. Most cities in Latin America do not have adequate systems, and in rural areas many houses do not have any kind of excreta disposal facilities. The proportion of the urban population living in houses connected to sewerage systems is much smaller in Latin America than the proportion in houses connected to community piped water systems. Moreover, establishing methods for financing construction and improvement of sewerage systems with repayment is more difficult than for water, especially in rural areas. However, plans are being prepared in many countries in coordination with those for construction and improvement of water systems.

By country, as shown in Table 7, the range in the percentage of the urban population with installations was from 16 to 66 per cent in the 9 countries with data available. For total population, urban and rural, the range was from 5 to 58 per cent. Only 3 countries reported any installation in rural areas, but this is of course affected by definitions used for urban and rural. In general, no recent accurate figures are assembled on facilities in rural areas.

VII. Pan American Health Organization Role in a Water Program

Aware of these facts—high incidence of water-borne and water-controlled diseases and an increase in the number of persons without water due to the exploding population—the World Health Organization and its Regional Office, PAHO, promoted an aggressive water program in 1959, on a worldwide basis. At the Directing Council held in 1959, note was taken of the fact that it was financial problems which most severely limited the construction of water systems. The PAHO adopted in 1959 the basic philosophy that investment in water systems would be realized only when the administration, management, and fiscal policies

are sound. The policy, in brief, has been that the Organization can best assist in the solution of water problems by concentrating on the creation of sound water organizations having good management, by concentrating on mechanisms of revenue production and through realistic water rates structures, and by building the confidence of investors in water supply operations.

Two years later, in 1961, the Charter of Punta del Este was signed. This Charter is designated to assist the socioeconomic development of

TABLE 5
URBAN WATER SUPPLY IN THE CARIBBEAN, 1962
(Thousands)

COUNTRY OR TERRITORY	URBAN POPULATION SUPPLIED						URBAN POPULATION NOT SERVED	
	From house connections		From public outlets		Total served		No.	%
	No.	%	No.	%	No.	%		
Latin American Caribbean Countries								
Colombia	5,570	79	780	11	6,350	90	700	10
Costa Rica	450	98	10	2	460	100	0	0
Cuba	2,380	61	1,130	29	3,510	90	390	10
Dominican Republic	550	57	270	28	820	85	150	15
El Salvador	590	58	270	27	860	85	160	15
Guatemala	470	39	490	41	960	80	240	20
Haiti	180	25	260	35	440	60	290	40
Honduras	160	34	220	46	380	80	100	20
Mexico	10,300	55	5,600	30	15,900	85	2,800	15
Nicaragua	220	38	240	42	460	80	120	20
Panama	390	84	60	11	450	95	20	5
Venezuela	2,370	50	1,660	35	4,030	85	711	15
Subtotal	23,630	59	10,990	27	34,620	86	5,681	14
Other Caribbean Countries and Territories								
Bahamas(a)	19		11		30	100		
Jamaica	489	99	2	1	491	100		
Netherlands Antilles	80	100			80	100		
Puerto Rico	1,050	100			1,050	100		
Trinidad and Tobago	145	99	2	1	147	100		
West Indies	196	98	4	2	200	100		
Subtotal	1,979	99	19	1	1,998	93		
Total(b)	25,609	61	11,009	26	36,618	87	5,681	13

Source: *Urban Water Supply Conditions and Needs in 75 Developing Countries*, Dietrich and Henderson, Public Health Paper 23, WHO.

(a) 1953 Census.

(b) In spite of the fact that the reporting year is not the same for each country and though not all of them reported, this total has been added to appraise the urban water situation in the Caribbean.

the Latin American countries. In regard to water and sewerage, a goal was established to provide both services to 70 per cent of the urban and 50 per cent of the rural population in the decade that began in 1961. Of special interest is another goal set in health problems: the reduction by 50 per cent of the mortality in the age group under 5 years. It has been shown above that 16 to 30 per cent of the deaths in this age group are due to diseases related to water.

The impact of the Charter of Punta del Este has been essential in regard to urban water supplies for those Latin American countries lo-

TABLE 6
RURAL WATER SUPPLY IN THE CARIBBEAN, 1963

COUNTRY OR TERRITORY	RURAL POPULA- TION	PER CENT OF TOTAL POPULA- TION	RURAL POPULATION SUPPLIED		RURAL POPULATION NOT SERVED	
			NUMBER	PER CENT	NUMBER	PER CENT
Latin American Caribbean Countries						
Colombia	8,907,604	59	90,000	1	8,817,604	99
Costa Rica	904,808	69	370,971	41	533,837	59
Dominican Republic	2,095,544	70	314,332	15	1,781,212	85
El Salvador	1,544,084	63	154,408	10	1,389,676	90
Guatemala	3,104,000	76	372,480	12	2,731,520	88
Haiti	3,825,970	86	114,779	3	3,711,191	97
Honduras	1,447,000	77	28,940	2	1,418,060	98
Mexico	17,218,011	49	2,754,882	16	14,463,129	84
Nicaragua	897,408	59	8,974	1	888,434	99
Panama	672,000	59	369,600	55	302,400	45
Venezuela	3,550,000	43	1,775,000	50	1,775,000	50
Subtotal Signers	44,166,429	55	6,354,366	14	37,812,063	86
Other Caribbean Countries and Territories						
Bahamas(a)	51,014	63	510	1	50,504	99
Jamaica(b)	1,122,148	70	448,859	40	673,289	60
Netherlands Antilles	120,000	60	72,000	60	48,000	40
Puerto Rico	1,670,000	61	951,900	57	718,100	43
Trinidad and Tobago	684,100	84	547,280	80	136,820	20
West Indies	521,323	72	406,632	78	114,691	22
Subtotal Signers	4,168,585	42	2,427,181	58	1,741,404	42
Total(b)	48,335,014	53	8,781,547	18	39,553,467	82

Source: Estado de los Programas de Abastecimientos de Agua en Zonas Rurales de América Latina. Próspero Ruiz, Seminar on Rural Water Supplies, Bogotá 1964, Complemented.

(a) 1953 Census.

(b) In spite of the fact that the reporting year is not the same for each country and though not all of them reported, this total has been figured out to appraise the rural water situation in the Caribbean.

TABLE 7
NUMBER AND PER CENT OF POPULATION SERVED BY SEWERAGE IN URBAN AND RURAL AREAS
IN THE AMERICAS, RECENT YEARS

AREA	YEAR	TOTAL			URBAN(a)			RURAL		
		TOTAL(c) POPULATION	NUMBER	PER CENT	TOTAL POPULATION	NUMBER	PER CENT	TOTAL POPULATION	NUMBER	PER CENT
Colombia(c)	1960	14,132,000	4,838,000	34.2	5,932,000	3,645,000	61.4	8,200,000	1,193,000	14.5
Costa Rica	1961	1,187,000	121,000	10.2	421,000	121,000	28.7	766,000	...	...
Dominican Republic	1960	3,014,000	...	...	918,000	158,000	17.2	2,096,000	...	...
Guatemala(b)	1961	3,678,000	256,000	7.0	865,000	255,000	29.5	2,813,000	1,000	0.0
Haiti(b)	1961	4,102,000	...	...	402,000	...	...	3,700,000	...	...
Honduras	1961	1,991,000	126,000	6.3	618,000	126,000	20.4	1,373,000	...	...
Nicaragua(b)	1961	1,732,000	92,000	5.3	568,000	92,000	16.2	1,164,000	...	...
United States(b,d)	1957	168,100,000	98,400,000	58.5	147,900,000	98,400,000	66.5	20,200,000	...	...
Venezuela(b,c)	1960	7,288,000	1,385,000	19.0	4,371,000	1,318,000	30.2	2,917,000	67,000	2.3

Source: Summary of four-year reports on health conditions in the Americas 1957-1960, *Scientific Publications No. 64*, Pan American Health Organization, July, 1962.

(a) Urban usually refers to cities with 2,000 or more inhabitants.

(b) Population figures may differ from Table 5 since it was advisable to use data from source supplying information on sanitation services.

(c) Urban includes cities of 5,000 or more inhabitants.

(d) All but rural farm population included as urban.

TABLE 8

INTERNATIONAL FUNDS USED FOR THE CARIBBEAN CONSTRUCTION
OF WATER SUPPLY AND SEWAGE SERVICES IN THE
CARIBBEAN IN THE PERIOD 1960-1963
(U.S. Dollars)

COUNTRY	IDB		IBRD	AID (a)		EXIMBANK	ESTIMATED AMOUNT OF DOMESTIC FUNDS
	WATER	SEWERAGE		WATER	SEWERAGE	WATER SEWERAGE	
Colombia	26,165,930	7,833,000					36,334,158
Costa Rica	100,000			4,000,000		4,500,000	2,350,000
Dominican Republic	1,000,000						
El Salvador	3,280,000	1,500,000					2,530,000
Guatemala	2,475,000	1,200,000					1,740,000
Haiti	2,550,000						160,000
Honduras	2,150,000			3,050,000			550,000
Jamaica				3,700,000			
Mexico	8,650,000	550,000					6,080,000
Nicaragua		185,000	3,000,000	600,000			3,000,000
Panama	2,762,000			9,815,000			2,553,000
Venezuela	26,000,000						35,600,000
Trinidad and Tobago						9,000,000 ^b	11,971,000 ^b
Total	75,132,930	11,268,000	3,000,000	21,165,000		13,500,000	102,868,158

SUMMARY

International loans	US\$ 124,065,930
Domestic funds	102,868,158
Total invested	US\$ 226,934,088 ^{c,d}

Source: Status of the Continental Water Supply and Sewage Disposal Program. CD 15/16, PAHO/WHO 14, July, 1964.

^a For AID it has not been possible to separate the amount for water supply projects from that for sewerage projects; however, the share allotted to sewerage projects is known to be relatively small.

^b For sewerage systems only.

^c In addition to the funds contributed by the countries to programs receiving international assistance, those countries have made public or private investments in the amount of approximately US\$50 million in programs either financed solely by them or with the assistance of grants from international agencies or foundations such as UNICEF. This additional sum brings the total amount of money invested in the Caribbean in water supply and sewerage programs to about US\$300 million.

^d Of this total, only US\$20 million are invested in rural areas.

IDB — Inter American Development Bank

IBRD — International Bank for Reconstruction and Development (World Bank)

AID — Agency for International Development

EXIMBANK — Import and Export Bank

cated in the Caribbean, as may be seen in Table 8, in which the programs financed by international organizations are shown. It is estimated that a substantial number of countries will reach the goal of providing water to 70 per cent of the urban population by 1971. It is estimated that for the period 1960-1963 a total equivalent to US\$226.9 million was committed, of which a substantial part is for urban water supplies. Another US\$50 million have been financed solely by them; this additional sum brings the total to about US\$280 million.

VIII. Future Activities

As may be appreciated, the situation regarding the urban areas tends to improve with the financial assistance being provided by international lending agencies. It is expected that the goal to provide water to 70 per cent of the urban population will be reached by several of the Caribbean countries by 1971. However, to accomplish this aim will demand much effort and full dedication by those concerned with the financing and engineering aspects of the programs. About 25 million urban population should be provided with water in 10 years and the programs already financed are enough to supply 10 million.

In the rural areas the situation is more difficult to solve due mainly to the problems in forecasting proper financing schedules with the participation of the communities. Efforts are being made by the PAHO to find a new approach by creating revolving funds which from the beginning would receive the support of international loans. In this plan recognition is given to the importance of good organization and administration. It is estimated that about 30 million rural inhabitants should be provided with water within the next 10 years.

In regard to sewage, the lack of enough information has made it impossible to obtain a clear picture of the situation. Nevertheless, it is by far more acute than the water situation. It will be more complicated to solve the problems in the urban areas, where sewerage systems will be needed, while in the rural areas less elaborate systems such as latrines and septic tanks may be used on an individual basis.

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**Paul L. Rice: CONTROL OF INSECTS OF PUBLIC HEALTH
IMPORTANCE IN THE CARIBBEAN**

METHODS OF CONTROLLING INSECTS which affect man's health have gone through a historical development in the Caribbean similar to that in other regions in the Americas. However, there are episodes of this history peculiar to the area. There has been a progression in methods from the primitive ones employed by the aborigines, early explorers, and colonists to the dramatically effective measures developed largely since World War II. Throughout these developments the Caribbean has served uniquely as an important proving ground in developing controls for insect-borne diseases through sanitation measures and attacks on the vectors.

I. Insect Control by the Caribbean Indians and Early Explorers

Man's concern in the sixteenth century with those insect pests which we now know to be of public health importance was occasioned entirely by the fact that they caused him irritation, pain, or annoyance. Epidemic typhus was known in the Americas at least as early as the Cortez invasion (14)*, and malaria was observed among the Spanish colonists as early as 1493 (18). It has been suggested by Osborn (15) that the fall of the Mayan civilization may have been caused by malaria or yellow fever. However, neither the white man nor the red man associated these diseases with the bites of insects. A period of over 300 years would pass before this fact would be established.

*Italicized numbers in parentheses refer to the numbered items in References on page 122.

Repellents.—Indians of the Caribbean undoubtedly had come to recognize that smoke repelled many biting insects. They also made use of repellents applied to their skins. An example of the latter is discussed by Sheldon in his account of the Carib Indians.

It was difficult to judge the colour of their skins because they were always painted with roucou which gave them the appearance of boiled lobsters. The coat of paint served them as a species of clothing, preserved their skins from the hot rays of the sun, and defended them against the mosquitos and gnats which would have nearly devoured them had their skins been naked; but these insects have an antipathy to roucou. . . . Every morning or, whenever they [the men] arose from their hammocks, they washed themselves in the sea or some river, and when the sun had dried them, they sat in their carbets [huts] until their wives had tied their hair, oiled it, and after dissolving some roucou in the carapa or caster oil they painted them with a brush from head to foot (19).

The account also makes reference to the fact that the women painted themselves with roucou (also spelled "urucu"). This dye was made by the Indians from the pellicle which covers the seeds of the annatto tree (*Bixa orellana*).

Control by Hand.—As is true of primitive people today, for example, certain tribes of New Guinea (25), vermin such as lice and fleas were collected by hand and eaten. The following quotation from the Spanish colonist, Fernández de Oviedo, written in 1526 in a publication entitled "National History of the West Indies," illustrates this point.

The Indians delouse each other. The women are the best flea cleaners. They eat all the vermin they can catch, and it is with difficulty that we can prevent our own household servants from doing so (3).

An account of tick removal recorded by the same author follows.

In many parts of *Tierra Firme* [a term referring to the mainland of northern South America and Central America], the Indians and Christians wear loose trousers rolled up, because there is much water, and when they cross the fields many ticks on the brushes stick to them. . . . There is only one way they can be removed from the flesh, and that is by covering the legs or other infested parts with oil. Then the insects can be scraped away with a knife. The Indians who do not have oil, burn them out and suffer intense pain in the operation (1).

It is known that North American Indians killed lice by plastering clay or mud on their heads. They had discovered that the treatment had to be repeated in order to be effective. Mud does not kill the eggs (2).

The early inhabitants of the West Indies probably used similar methods of louse control.

Control by Geography.—Fernández de Oviedo gave this interesting interpretation of how vermin could be eliminated by passing a certain geographical point.

Only rarely, are Christians in the new world bothered by the small pestiferous insects that grow in a man's hair and on his body. Because after we pass the line of the diameter where the compass needle changes from northeast to northwest, which is only a short distance beyond the Azores as we continue the voyage to the West, all of the lice on the men's heads and bodies die, and as I have said, the Spaniards are clean and little by little all vermin disappear and are not to be seen. No Christian in the Indies, except a few children born there, have vermin on their bodies. Most Indians, however, do have them in their hair. . . .

In all this one interesting thing can be observed. Even though we do not have these vermin in our hair and on our bodies while we are in the Indies, when we are returning to Europe, as we reach the place in the Atlantic where the vermin left us on the westward trip, once again we are attacked, as if the lice were lying in wait for us. . . . I have seen all this happen several times, since I have crossed the Atlantic four times following this course (3).

Since it may be difficult to put forward a full and logical explanation of this observation perhaps it might be best to let the sixteenth century account stand or fall on its own merits.

II. Developments Near the Turn of the Century

A number of important discoveries in the latter fourth of the nineteenth century and in the first year of the twentieth century made possible significant developments in insect-borne disease control first applied in the Caribbean. The earliest of these was the demonstration in 1879 by Manson in China that filarial parasites of man are found in the tropical house mosquito (*Culex fatigans*). It was not until 1890, however, that Low went on to show that transmission of the worms occurs through bites of the mosquito (14). A Cuban physician, Dr. Carlos Finlay, in 1881, claimed that the mosquito, now identified as *Aedes aegypti*, spread yellow fever by its bites, and he presented some experimental evidence to support his claim. By 1891 he had accumulated limited additional proof (17).

These discoveries were followed in 1893 by Smith's and Kilborne's confirmation of the cattle tick as the vector of the Texas cattle fever, and in 1895 by Bruce's discovery that nagana of cattle was spread by

the bite of the tsetse fly. Ross' incrimination of *Anopheles* mosquitoes as malaria vectors, announced in 1879, was followed in 1900 by Reed's extensive experiments in Cuba which went beyond Finlay's work to confirm with certainty the theory that yellow fever is spread by the mosquito, *Aedes aegypti* (5,6).

The enthusiasm and joy of discovery felt by Reed, Chairman of the Yellow Fever Commission sent to Cuba by the United States in 1899, is shown in the following quotation from a letter written by him under date of January 13, 1901. "The mosquito theory of the propagation of yellow fever is no longer a theory but an established fact. Isn't it enough to make a fellow feel happy!" (6).

Although Reed and his associates received full credit for their work in confirming *Aedes aegypti* as the vector of yellow fever, it might be interesting to note that others had a part in developing the idea which they exploited. As early as 1848, Josiah C. Nott of Mobile, Alabama, published a statement of his belief that both yellow fever and malaria were spread by mosquitoes (23). The basic contribution of Finlay has been noted previously. Whether or not he accumulated enough experimental proof for his claim that he, and not Reed, should actually be credited with the discovery is a controversial question which historians must answer.

It might be of interest to note in passing that Reed and two of his co-workers, Lazear and Carroll, died directly or indirectly from their work on yellow fever shortly after their investigation was completed, and before its significance was fully appreciated. In contrast with these, both Manson and Ross were knighted for their discoveries by the British Crown and lived long to enjoy their fame.

Yellow Fever Eradication from Havana.—Immediately following the confirmation of *Aedes aegypti* as the vector of yellow fever, the United States Army of Occupation in Cuba, under Dr. W. C. Gorgas, started anti-mosquito work. This undertaking soon led to the elimination of yellow fever and a marked reduction of malaria in Havana. This was the first time in history that a major battle against disease had been won through the use of sanitation and insect control measures.

Yellow fever had been present in Havana every month of the year since 1762. The campaign of eradication started on February 1, 1901. After making a hurried study of the habits of the yellow fever mosquito, which indicated that the species in all its life stages is closely associated with man, four major methods of attack were applied.

1. Elimination of mosquito breeding sites by destroying useless containers, such as tin cans, and emptying the water from others.

2. Treating domestic water containers with oil.
3. Fumigation of houses to eliminate adult mosquitoes.
4. Use of screen or gauze to keep adult mosquitoes from laying eggs in domestic water containers such as cisterns and barrels, and from entering houses to bite (13).

As early as 1899 Finlay had developed nine rules for combating yellow fever which showed keen insight in how to approach this problem (17).

Teams went from house to house to conduct inspections, destroy containers, and treat water, while others carried out fumigation and screening activities. The two most used fumigants were flowers of sulfur and pyrethrum powder, both administered by burning 1 pound in 1,000 cubic feet of space, with increased amounts in rooms that could not be made tight. Although fumigation of all homes in an area of high risk was sometimes carried out, more frequently the only houses so treated were those of the yellow fever patient, his neighbors, and those he had visited the week before and three days after he became sick. Where possible the patients were removed to specially screened wards in hospitals (13).

The results of this well-disciplined campaign were immediate and dramatic as is shown in Table 1 (13).

TABLE 1

DEATHS FROM YELLOW FEVER IN THE CITY OF HAVANA, 1890-1901

YEAR	NUMBER
1890	308
1891	356
1892	357
1893	496
1894	382
1895	553
1896	1,282
1897	858
1898	136
1899	103
1900	310
1901	18

By September, 1901, the disease had been eradicated completely (23).

Yellow Fever Eradication in Panama.—A French company had attempted to construct a canal across the Isthmus of Panama from the Caribbean to the Pacific during the years 1880 to 1889, but the attempt was unsuccessful, largely because of yellow fever and malaria. With a foreign work force of up to 16,500, as many as 308 deaths from yellow

fever had occurred in a year (13). When the French effort failed, rights to build the canal were obtained by the United States government. The severity of the health problems involved was well recognized from the start, as was illustrated in the 1905 newspaper cartoon printed in the United States showing a mountain labeled "Yellow Jack" (yellow fever) blocking the way to Panama (23). Dr. L. O. Howard, Chief of the Bureau of Entomology, U.S. Department of Agriculture from 1894 to 1927, made some statements on this point.

President Roosevelt early appreciated the fact that great as were the engineering difficulties to be surmounted in the making of the Panama Canal, the difficulties of sanitation would be fully as great, if not greater, and, before the first Canal Commission was appointed, he told a committee of the American Medical Association, the American Association for the Advancement of Science, and the New York Academy of Medicine . . . that it was his intention to seek for the best man in the world for the task, to pay him whatever would be necessary, and to give him full power. Fortunately, the man needed was found in the person of Colonel (now General) Gorgas, fresh from his triumphant cleaning up of Havana with the consequent elimination of yellow fever and malaria (13).

When General Gorgas started his task in Panama in 1904, the danger spots were considered to be Panama City, with a population of 25,000, and Colón, with a population of 4,000. The following decree signed by W. C. Gorgas, Chief Sanitary Officer, issued by the mayors of the two cities is a record of the first step in this battle:

Ordinance Number 6. Under the authority granted by decree No. 25, of July 8, 1904, issued by the President of the Republic of Panama, the following sanitary regulation is issued:

Breeding of mosquito larvae (wigglers) is prohibited within the limits of the City of Panama and the occupants of premises will be held accountable for violation of this regulation.

All cisterns, water barrels, and deposits of fresh water must be made mosquito-proof, and all occupants of premises must see that other deposits of water are so arranged that mosquitoes cannot breed in them.

Violation of this ordinance will make the offenders liable to a fine of five dollars gold (13).

This ordinance was not fully observed. A yellow fever case was diagnosed in late November, 1904. This was followed by a number of other cases. Drawing upon his experiences in Havana, General Gorgas and his sanitary army went into action in Panama City and Colón (13).

1. Premises were inspected routinely each week and containers in which mosquitoes might breed were either emptied or treated with oil.

2. Cisterns and barrels were screened.

3. Fumigation of buildings where a large number of foreigners lived or worked was carried out routinely at regular intervals. The houses of yellow fever patients and of those they had visited recently were also fumigated. In cases where the previous movements of a yellow fever patient could not be verified, no chances were taken and every residence in the city was fumigated.

4. All houses were screened.

As a result of these measures in the urban areas and modified control activities in camps and villages, yellow fever was eliminated. The last case occurred on September 28, 1905 (13).

By applying the mortality rates which prevailed during the attempt by the French to construct the canal it is estimated that 14,000 employees and a like number of dependents would have lost their lives from yellow fever during the ten-year construction period, 1904-1914. Apparently less than ten actually died from the disease (13).

Malaria Control in Cuba.—Although some of the measures directed against yellow fever mosquitoes had an effect upon malaria mosquitoes, the different habits of the latter required that additional procedures be applied in order to obtain effective control. General Gorgas' malaria control work was started in 1901, almost simultaneously with similar efforts by Ross in the Middle East. These were the first attempts made to control malaria by sanitary measures. Gorgas' methods of combating malaria mosquitoes in Cuba, after trial and refinement, were transplanted to Panama and will be discussed subsequently in some detail.

The data presented by LePrince and Orenstein (13) shows how effective the malaria control campaign in Havana was (Table 2).

TABLE 2
DEATHS CAUSED BY MALARIA IN HAVANA, 1871 - 1914

DECADE	NUMBER OF DEATHS
1871-1880	3,415
1881-1890	2,050
1891-1900	5,633
1901-1910	444
1911-1914 (4 years)	25

In order to evaluate these data properly, it may be of interest to note that in 1901, when antimalaria measures were started, Havana had a population of 350,000.

Malaria Control in Panama.—The following principal lines of attack against malaria were used by Gorgas in Panama (13).

1. To eliminate standing water where *Anopheles* mosquitoes breed, small areas were filled by the use of pick, shovel, and wheelbarrow, and larger ones by scrapers drawn by horses.

2. Draining breeding areas was accomplished by digging ditches or installing tile drains.

3. For oiling breeding areas, kerosene and crude oil were used. Application was made by spraying the oil onto water surfaces at weekly intervals or, in the case of slowly moving water, by some "drip" device which made possible a continuous application.

4. The recommended formula for larviciding breeding areas was as follows: resin, 150 to 200 pounds; caustic soda, 30 pounds; carbolic acid, 150 gallons.

The resulting mixture was described as a black, liquid, resin soap which was toxic to mosquito larvae at a dilution of 1 to 5,000 but was harmless to poultry or cattle at this dilution.

5. Stocking of ponds with certain species of fish which feed upon mosquito larvae was considered somewhat beneficial but did not reduce mosquito breeding to a low level.

6. The removal of vegetation from streams made the streams less favorable for mosquito larvae.

7. The removal of jungle growth was necessary in areas of construction camps in order to make possible the location and treatment of mosquito breeding sites.

8. The screening of windows and doors, which reduced the contact of the yellow fever mosquito with man, was equally effective with respect to anopheline mosquitoes.

9. In areas where draining and larviciding were impractical, a daily collection by hand of the adult mosquitoes found in dwellings, by means of chloroform bottles, was carried out as a means of control.

An evaluation of and a high tribute to the antimalaria work done in Panama was made by Dr. Malcom Watson, who had directed the malaria control work in the Federated Malay States, after a visit to the Canal Zone. His report to the Royal Colonial Institute is quoted by LePrince and Orenstein (13).

As the greatest sanitary achievement the world has seen, it has a lesson for us. I went there because I wanted to study the details of their methods, in particular how much of their excellent results were due to drainage, and how much to screening, oiling and quinine. From my visit I concluded the results were mainly from oiling, which was done for practically half a mile on each side of the canal, or at least the inhabited portion of the Zone. The great majority of the population do not live in

screened houses and very few take quinine. Drainage is constantly interfered with, and there is no agriculture. Colonel Gorgas had therefore everything against him except the determination to win and money to back him. Depending on oiling, the organization has to be, and is, perfect; for failure for a single week would allow mosquitoes to develop. Their position is as if they had a wild beast by the throat, but were not allowed to kill it; yet if for a moment their grip were to be released, the beast would be on them. No greater sanitary work has been done; I doubt if we will see as great again. It is perfect work, and its organization is the only kind that would have succeeded under the circumstances.

The results in malaria control were highly successful as indicated in Table 3 (13).

TABLE 3

MALARIA IN THE CANAL ZONE: AVERAGE MONTHLY MORBIDITY
RATES OF MALARIA EXPRESSED AS PERCENTAGES
OF THE TOTAL WORK FORCE

YEAR	AVERAGE MONTHLY RATE
1906	6.83
1907	3.61
1908	2.36
1909	1.81
1910	1.55
1911	1.54
1912	0.93
1913	0.64

III. Modern Developments

Recent advances in insect control in the Caribbean are, in part, through the application of methods which have been developed elsewhere. Entomological research organizations in the area are not numerous or large, so it becomes expedient to utilize methods developed in other areas which may be applicable, using the limited funds available for research to attack problems unique to the area. Thus, for example, we find Puerto Rico, Jamaica, and some other islands applying methods for controlling pest mosquitoes developed largely in the United States. However, there are a number of special problems and interesting applications of insect control procedures which are worthy of attention.

Eradication of the Screw-worm Fly from Curaçao.—A method of controlling an insect pest by liberating in infested areas large numbers of males sterilized by irradiation was developed by scientists of the United States Department of Agriculture. Knipling (9) lists the key factors

effecting the success of the sterile male technique in controlling an insect pest.

1. A suitable method of mass rearing must be developed.
2. An adequate dispersion of sterile males must be obtained.
3. Sterilization must not adversely affect the mating behavior.
4. The female must normally mate only once.*
5. The population must be inherently low, or be made low by some method, such as by applying an insecticide.

The screw-worm fly, *Cochliomyia hominivorax*, is a destructive pest of livestock distributed from southern United States south to Argentina. It also produces myiasis in man. Research on this species indicated that it would be a likely subject for testing the sterile-male technique for control. After suitable methods of mass rearing and sterilization were developed, a site for a large-scale experiment was sought. The Caribbean island of Curaçao, which was infected with screw-worms, was selected.

Linquist reported in 1955 (11) that flies reared and sterilized in Florida were liberated from airplanes over Curaçao at the rate of 400 sterilized males per square mile per week, for seven weeks. This caused an initial sterility in the eggs of indigenous flies of 70 per cent, which soon increased to 100 per cent. Weekly releases were then continued for three more months during which no eggs, flies, or screw-worm cases could be found. The species was assumed to be eradicated.

This successful project was followed by applying this revolutionary method in a large-scale campaign in the southern part of the United States, a control effort which has also been highly successful. Scott (20) presents evidence to show that the campaign has resulted in a marked reduction of myiasis in man. The sterile-male technique is receiving considerable attention in the field of public health because of its possible application in controlling houseflies, mosquitoes, and other insects which affect man's health.

Mosquito Control.—Pest and encephalitis mosquito control by insecticides has been attempted in limited areas of the Caribbean for some years. The methods used have included applying fog and mist sprays against adult mosquitoes and larvicide sprays, all of which methods have been broadly used in the United States and elsewhere. In addition to reducing annoyance and discomfort, these measures undoubtedly brought some benefits in disease control during the 1963 outbreak of dengue in Puerto Rico and Jamaica.

*A subsequent publication by the same author indicates that single or multiple mating habits are not factors which will determine the success or failure of this method of control (10).

The control and eradication of the yellow fever mosquito, *Aedes aegypti*, has presented a particular problem. Even though a jungle reservoir of the yellow fever virus exists in monkeys, from which the virus occasionally breaks out and enters human hosts through the bites of forest-inhabiting mosquitoes, still any real threat of a yellow fever epidemic comes from the presence of *Aedes aegypti*, the only domestic vector of the disease in the Americas. Because of this threat the PAHO has spearheaded the drive to eradicate the yellow fever mosquito from the Western Hemisphere. The campaign has been highly successful in many countries in Central and South America and in Mexico.

The principal methods employed in anti-*Aedes aegypti* warfare are adaptations of certain of those applied successfully by General Gorgas in Cuba and Panama. Inspection, the elimination of breeding sites, and the spraying of domestic water containers and the surrounding wall areas, within a radius of three feet, with an insecticide have been standard procedures (7).

A map recently published by the PAHO shows the 1964 distribution of *Aedes aegypti* in the Americas (7). The major areas still infested are the southern United States, northern South America, and certain Caribbean islands.

A large-scale campaign was launched in 1964 to eradicate the yellow fever mosquito from the United States, Puerto Rico, and the Virgin Islands. A number of other infested countries, for example, Jamaica, are likewise attacking the problem. Eradication of the mosquito will be particularly difficult in the Caribbean because of widespread resistance of the species to DDT and other hydrocarbon insecticides in that area (4, 22). However, the situation is not discouraging since, in spite of this resistance problem, Trinidad completed a successful eradication campaign in 1960 (22).

The *Aedes aegypti* mosquito is still spread by man's vehicles as it was at the beginning of the century. This fact requires that officials in areas where the species has been eliminated be constantly on the lookout to prevent re-infestation by land, air, or water. A personal communication from Trinidad (21) states that the only foci of infestation of yellow fever mosquitoes found in 1964 were in water supplies of small boats which had come from Barbados and Venezuela. This discovery is leading the government of Trinidad to consider enforcing an old law requiring that transports screen their water supplies. Ghosts of General Gorgas!

Campaigns to control and eradicate malaria have been waged vigorously in the Caribbean since World War II, particularly during the last eight years. The principal weapon employed in these campaigns has

been the spraying of the interior surfaces of dwellings with long-acting, residual insecticides such as DDT. *Anopheles* mosquitoes which come to houses to bite, and possibly become infected with malaria parasites, are killed when they rest on sprayed surfaces. Efforts are not directed at stamping out all individuals of a vector species. This is usually not practicable. Instead the aim is to interrupt the cycle of transmission by killing all mosquitoes which become infected with malaria parasites.

Puerto Rico got rid of malaria by this method soon after the war. Jamaica and Trinidad and Tobago apparently have been recently successful in completing eradication, although this has not yet been certified by the PAHO. Venezuela has eradicated the disease from most of the country, but small and very limited problem areas of infection still exist. Central American countries and Mexico have been partially successful, but malaria still is found in certain larger problem regions. Other countries such as Cuba, Haiti, and the Dominican Republic still have a long way to go. A map has been published by the PAHO which shows the status of malaria in the Americas in 1963 (16).

An unusual type of control was developed to combat one of the malaria vectors, *Anopheles belator*, in Trinidad. This species breeds in water held in the axils of the leaves of bromeliads, epiphytes which grow attached to the branches of trees. This anopheline species is largely an outdoor biter, so the spraying of houses was not fully effective. Consequently, an attempt was made to eliminate the breeding sites by using power spray equipment to apply a herbicide, copper sulfate, to kill the bromeliads. This method was evaluated as being beneficial but not entirely practical (24).

Sandfly Control.—Tiny biting flies belonging to the genera *Culicoides* and *Leptoconops*, and often called sandflies, frequently are severe pests in Caribbean resort areas. Consequently, considerable research work has been carried out in developing controls for these pests. In Montego Bay, Jamaica, the following practices have proven to be useful (1, 8, 12).

1. *Culicoides* breeding areas (mud in swamps) are sprayed with malathion in diesel oil every ten days.

2. *Leptoconops* breeding areas (moist white sand) are sprayed with dieldrin or with malathion every six months.

3. The hotel and residential areas are fogged with malathion and lethane in diesel oil once every seven days to eliminate the adults (and also adult mosquitoes).

Considerable progress is being made in controlling *Culicoides* by filling swamps and by manipulating the beaches in such a way that the

sand remains too dry for the breeding of *Leptoconops*. Good results have been obtained elsewhere in flooding mangrove swamps for *Culicoides* control, through the use of tide gates. Plans are being developed to try this method in Jamaica (12).

IV. Summary

The control of insects of public health importance in the Caribbean has been briefly traced from the simple methods of hand destruction and the application of repellents utilized by the Indians to the present-day use of such outstandingly effective methods as applying long-lasting insecticides and liberating sterilized males. The Caribbean is best known in the field of public health entomology for the contribution of workers in this geographical area in demonstrating that insect-borne diseases can be controlled and even eradicated by measures directed against the vectors themselves. The outstanding contributions of General Gorgas in yellow fever and malaria control in Cuba and Panama during the first decade of the twentieth century are directly related to such modern sequels as the recent and current campaigns to eradicate the yellow fever mosquito and the ancient scourge, malaria, from various countries comprising the Americas.

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Frances E. Williamson: EDUCATIONAL CAMPAIGNS
IN ST. LUCIA

IT WOULD BE FOLLY to assume that my topic, Educational Campaigns, holds the same meaning for everyone. But before I finish I hope to make my definition unmistakably clear. Further, I mean to make the most of this opportunity to sell my definition—should others be different; this is my personal campaign to impose a point of view.

We are certainly all familiar with political campaigns, military campaigns, and sales campaigns. Campaigns connote a spirit of competition, an aggressive activity. One dictionary defined campaign as “any course of aggressive activities for some special purpose.” Another, and this one I like, for it more nearly describes an experience I want to relate, defines campaign as “a series of connected activities to do or get something; a planned course of action for some special purpose.”

There is a point of view that an educational campaign should be run for a relatively short period of time, should have a stated launching date, gradually build up to a period of intense activity, then quickly terminate. This works fairly well when there is involved just one action that you want people to take. An example might be that you want everyone to get a blood test, a vaccination, a chest X-ray, a polio immunization, or the like on a particular day at a particular place.

I

The campaign I shall discuss was designed for a far longer period of time. In fact, in the development of the plan it was envisaged as at least a five-year effort. Therefore, I wish to describe the educational campaign that started with some intensity in 1961 in the island territory of St. Lucia in the West Indies.

This territory, with a population of approximately 90,000 people, is, in the main, dependent on an agricultural economy. Bananas and sugar cane are the main crops. Tourism is gradually developing and will augment the territory's livelihood.

The city of Castries is the seat of government. Approximately a third of the population lives in and near the city. The remainder of the population is scattered throughout the territory in rural areas with clusters near the six or more villages. The Medical Department has its main office in Castries and at least 14 health centers and hospitals distributed throughout the island.

Doctors and nurses are assigned to the hospitals. Nurses or midwives are assigned to health centers to which physicians go on schedule to conduct clinics. The public health inspectors are assigned districts of the territory.

The WHO/PAHO and UNICEF have sponsored programs and consultants in St. Lucia for many years. My service to the territory was provided through the United States Agency for International Development and the now dissolved federal government of the West Indies. During my tenure the United States Peace Corps provided a group of 15 volunteers to St. Lucia. This original group was replaced in the summer of 1963 with another group of volunteers.

One week of each month I devoted to St. Lucia and participated with the staff of the Department of Medical Services in their many programs. Other agencies providing service to St. Lucia were equally involved in their planning and programming. This cooperation began, to my knowledge early in 1959, and possibly long before, when a series of workshops were held in St. Lucia in which health education needs were discussed.

Major health problems delineated at these workshops included malnutrition, intestinal diseases, tuberculosis, and social diseases. Through a series of staff discussions and meetings following my arrival, it was decided that priority should be given to the problems of intestinal diseases.

The decision to concentrate on the educational aspects of this problem was made for several reasons.

1. A program of latrine construction and water provision had been started with the assistance of WHO and UNICEF.
2. A recent survey had produced evidence of the presence of Bilharzia in all the fresh water streams with a sizable segment of the population already infested.
3. All members of the health staff had the opportunity and responsibility to reach and help the public with this problem.

4. There was assistance available to families through the provision of some means of combatting the problem—the component parts of the latrine.

5. Success in the campaign could be evaluated by the individual when intestinal diseases came under control.

6. The staff could evaluate at least partial progress when families began to install and use latrines and acquired their water from the safer sources or took action to make their household water safe. Also, there was a noticeable increase in the wearing of shoes or foot protection. The reported incidence of the diseases would be expected to drop, as would infant hospitalization and mortality.

7. The schools had expressed interest in participating in health education programs.

In this eradication campaign, the decision was made to include the following diseases: roundworm, hookworm, threadworm, bacillary dysentery, Bilharzia, and typhoid fever.

II

Proceeding from this background I should like to describe our activities and in so doing illustrate the points that must be considered in conducting an educational campaign.

The planning began with the staff of the department. The program was thus designed on the basis of an expressed and known need with full knowledge of the resources available to help do the job. The objectives and methods of achieving them were developed in the Medical Department.

The other agencies that would be assisting were involved from the beginning through the utilization of a committee that had been organized to resolve another health problem—the provision of milk. On this committee were represented the other official departments and several voluntary agencies. The top officials of the government were informed from the beginning and gave their support to the program. The chairman of the committee was the Chief Medical Officer.

The campaign began with in-service education for the health staff so that they were fully informed on the diseases and current control measures as well as more skilled in communicating the information to the people and motivating them to action. It was important that all disciplines knew and understood their roles. Educational materials and programs were developed for the staff, by the staff, and for use with the public. Films were acquired, radio programs were developed and presented, and exhibitions were planned around the theme of intestinal

diseases. Special film showings were organized for the leaders of government. Information on the program and its progress was given the leaders regularly. In-service education programs for teachers were planned and presented.

The program was kept as flexible as possible in order to capitalize on changes and events. For example, an outbreak of typhoid fever shortly after the arrival of the Peace Corps Volunteers necessitated an intensification of the informational campaign and a vaccination program. With the Peace Corps nurses participating on the team, educational sessions were planned in every area that could be reached. Films were shown, talks were given, and procedure shared for vaccination clinics. The public health inspectors intensified their promotion of latrine installation and use of safe water.

As the adult educational program was able to expand with the assistance of some Peace Corps Volunteers, programs on health, specifically the intestinal problems, were included. The radio was an important medium used. Members of the health staff assisted in writing and presenting these programs. In one village, where the sanitation staff felt they might have a particular problem of digging pits for latrines, we set up special demonstrations. The village received a concentrated attack to show the staff what could be done through community organization and to help the village with its problems.

The series of activities in the village included the following:

1. A health team, including consultants, visit to the village and a survey of the situation.
2. Discussions with village officials.
3. Discussions with school officials.
4. Discussions with individuals in the village.
5. Meetings with the village council.
6. Meetings with the adult education groups.
7. Community film showings and discussions.
8. In-service education for teachers.
9. Demonstrations and discussions at health center clinics.
10. Demonstration lessons taught in classes by the Peace Corps nurse.

A noticeable increase in the installation and use of latrines in the village was evidence of a good beginning in the control and eradication program. An additional measure to help combat the Bilharzia problem was the plan for an island-wide water program. The WHO gave assistance on this planning through the provision of a survey team of engineers. I have no information regarding the progress of this plan.

Throughout the programming every opportunity was utilized to hold

staff discussions on the people, their beliefs, their superstitions, their value systems, prestige symbols, traditions, social groupings, and practices. It was felt most important for all staff to understand these before they made attempts to change behavior and practice.

The appeal was related to the basic human wants of people. These include *recognition*—or the individual's need for a feeling of personal worth, acceptance, attractiveness, and well-being; *security*—or making a living, the freedom from poverty and dependency on others; *response*—or participation in a family, with a spouse; and *new experiences*—or variety in life.

Recognizing that people copy those they respect and admire as well as the prestige figures in the community, the staff endeavored to carefully practice their own preaching.

The school children were considered an important target group, as their behavior changes would ultimately influence changes in the future generations. The adult education groups were also important, for their participation in that program symbolized the presence of some motivation to change or improve.

Planning for an additional school for secondary education and a facility for teacher training had begun as I completed my tour of the West Indies. Here again, the planners of the educational campaign gave consideration to including these facilities in their program. A hundred or more graded health texts were made available to the Education Department for use in these schools. The Castries librarian reviewed her health materials and provided a special shelf for them.

Although I have not specified a timetable for the program, you have undoubtedly noted that it was to span several months, even years, with certain periods of intensity. Timing on programs, especially in-service education, was important as school holidays were utilized for the teacher training sessions.

Our educational campaign, then, can be described as a series of connected activities to help educate the public—a planned course of action to assist with the achievement of eradication of the stated intestinal diseases.

III

To my knowledge the campaign continues. At the time of my departure from St. Lucia we had followed this procedure.

1. The campaign was based on an explored and stated need, and objectives were established.

2. The community, its leaders, and its people were studied.
3. All parties involved were informed and proper clearances made.
4. A coordinating committee of several agencies helped direct and maintain communications.
5. News media were involved from the early planning stages.
6. The people and their practices were studied, approaches to them evaluated, and methods for reaching them were decided.
7. Flexibility was maintained throughout.
8. The educational program began with the staff and roles were delineated.
9. Specific activities were designed for specific target groups.
10. Appeals were related to basic human wants.
11. Methods for evaluating the program were decided in the planning stage.
12. Periodic review and evaluation were done; one special session followed the outbreak of typhoid fever.
13. A final evaluation should be made at the termination of the specified time.

I regret that I cannot, at this stage, point with pride to this as a success story. My information on the progress of the total health effort is incomplete. I remain confident that our approach to the problem is sound because we made efforts to involve the people at all levels. I am a firm believer in the idea that when the people concerned become involved in the decision-making they remain committed to the goals established and follow them through to completion.

Part IV

DISEASES

**Ruth R. Puffer : MORBIDITY AND MORTALITY IN THE
CARIBBEAN**

UNDERSTANDING OF THE HEALTH PROBLEMS through morbidity and mortality in the Caribbean requires knowledge of the wide differences in the populations in the countries in this large area of the Americas. Thus the growth and age distribution of the populations of the countries will be considered first, followed by selected illustrative material on morbidity and mortality. Since accurate data on morbidity and mortality are dependent on diagnostic facilities and services of physicians, some information is provided regarding the distribution of physicians and hospitals. Also the program of the PAHO to improve vital and health statistics so that data will become available for more adequate measurement of the problems and for evaluation of progress toward established goals is described briefly in this paper.

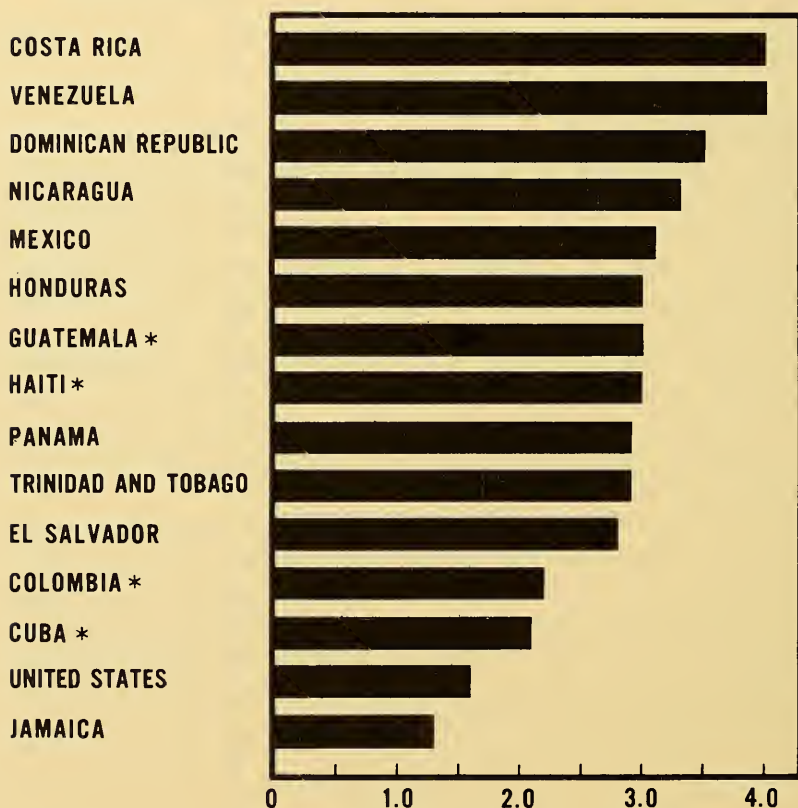
The source of data for this paper is principally the document of the Pan American Health Organization, *Health Conditions in the Americas, 1961-1962*.¹ The countries of the region provided the basic information in a Supplementary Questionnaire to the Second Report on the World Health Situation, 1961-1962, and in the WHO/PAHO Annual Questionnaires. This publication is the fourth in a series of summary reports on health conditions in the Americas.²

1. Population

A census has been taken in the years 1960-1964 in all but three countries and two territories of the Americas. Thus figures are available for use in many phases of planning health programs and for estimates of

population. On the basis of data from the censuses around 1950 and 1960, the annual rates of increase of the populations have been calculated. The entire region of the Americas has been growing at a rate which is more rapid than in any other region of the world, except Oceania. The annual rate of increase for the region was 2.3 per cent per year; for the world the rate during this period was 1.8 per cent per year.

In Figure 1, the annual percentage growth rates are given for 15 countries of the Caribbean area. As used in this paper, the area includes also neighboring countries and all of Central America. This presentation has been limited to countries, since the populations of the other areas in the Caribbean are small having less than 500,000, with the exception of Puerto Rico. The variation in these growth rates is great; that of Costa



*Census for 1960's not yet taken. Estimated population for July 1, 1960, used to determine annual growth rate.

Figure 1—Annual percentage growth rates of population between the two most recent censuses, in countries of the Caribbean

Rica and Venezuela stand out as the highest—being 4.0 per cent per year. Others with rates of 3.0 per cent per year or more are the Dominican Republic, Nicaragua, Mexico, Honduras, Guatemala, Haiti, and Panama. At the other extreme, Jamaica had the lowest growth rate of 1.3 and the United States was next with 1.6 per cent per year.

The age distributions of these populations also vary widely. Countries with high growth rates usually have high birth rates and a relatively young population. To illustrate the marked differences in the age distributions of two populations, the percentage distributions of the population into 15-year age groups for males and females are shown for the United States and Honduras in Figure 2. In the United States over 15 per cent of the population were males under 15 years of age and another 15 per cent were females, giving 31 per cent of the population in this age span. In contrast, in Honduras nearly 25 per cent of the population were males

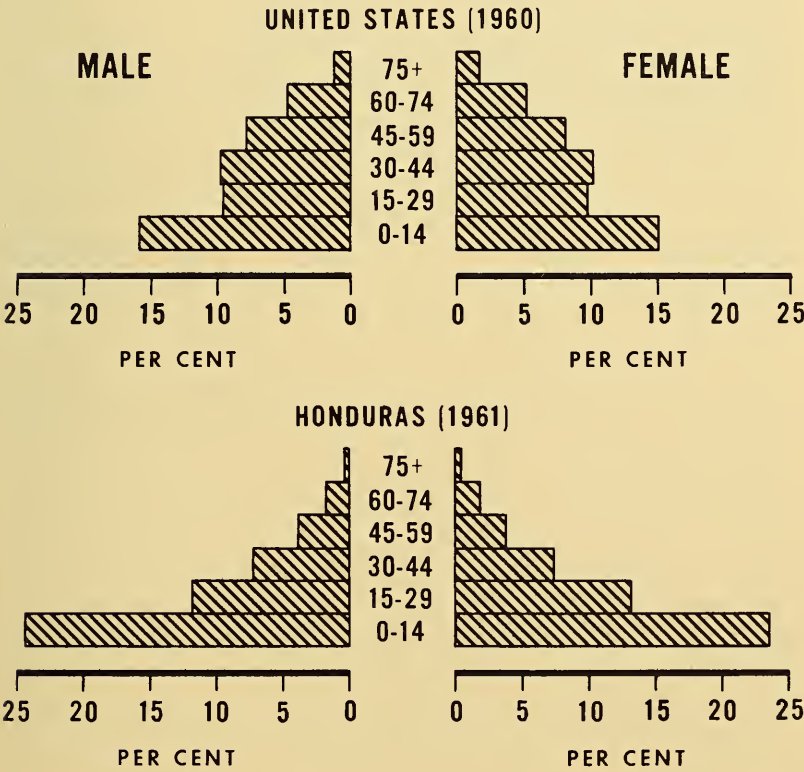


Figure 2—Percentage distribution by sex and age of population in two American countries, recent census

under 15 years of age and nearly 25 per cent were females, giving nearly half of the population (48 per cent) in this age group, that is, in infancy and childhood.

In the United States the proportions of the population in other 15-year age groups were rather large through the group 45-59 years of age; in Honduras, however, the proportions of the population decreased in these 15-year age groups so that the percentage in the 45 to 59-year age group was much lower than the comparable percentage in the United States. These figures show the great differences in the age composition of a country with a young population as Honduras and of a country with an older population as the United States. This difference is important for consideration of diseases in a country. The health problems as revealed by morbidity and mortality are intimately related to the age distribution of the population.

II. Mortality

Proportionate mortality by age is one way of analyzing deaths, that is by showing the distribution of deaths by age group as has been presented for the distribution of the population by age group. In Figure 3, the percentage distributions of deaths into three age groups, under 5 years of age, 5-49 years of age, and 50 years of age and more, are given for 13 countries of the Caribbean. The marked variations in the patterns of mortality by age in these countries are clear; the differences are far greater than were seen in age distributions of population.

The proportion of deaths in infancy and early childhood—under 5 years of age—is an important index of health problems. The variation is from 7 per cent of all deaths in this age group in the United States to 58 per cent in the Dominican Republic. In contrast, the variation of deaths in the age group 50 years and over was from 81 per cent in the United States to 23 per cent in the Dominican Republic. The disease problems in countries with a high proportion of all deaths in infancy and early childhood include the infectious, diarrheal, and respiratory diseases which are common in infancy and childhood. Measles, whooping cough, diarrheal disease, and pneumonia are the cause of many deaths. Some of these children who die in early life from diarrheal and infectious diseases have a complicating malnutrition. In countries as the United States with a high proportion of deaths in adult life, diseases of the cardiovascular system and malignant neoplasms are the leading causes of death.

The report on health conditions provides information regarding the

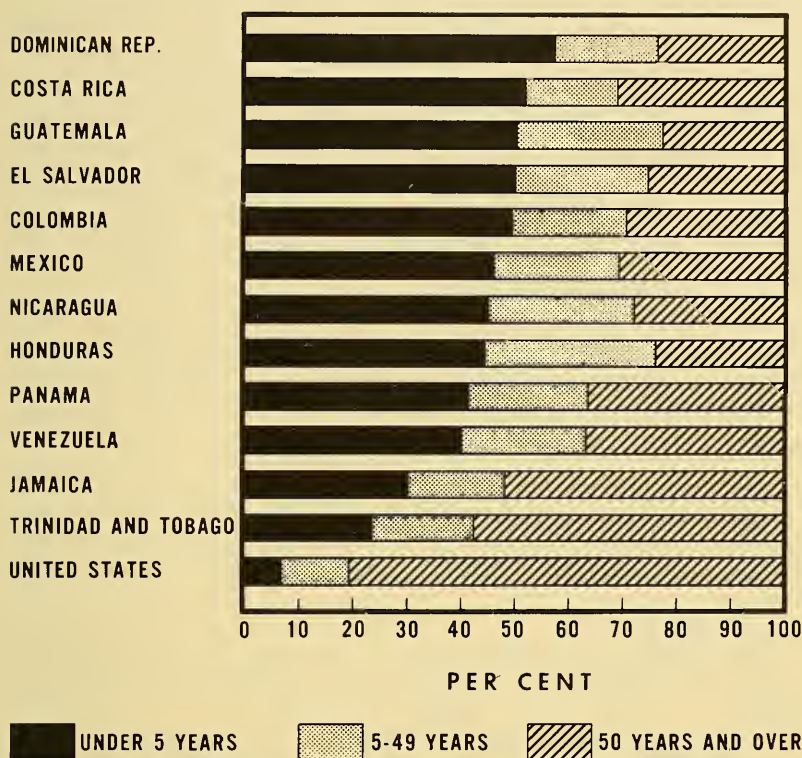


Figure 3—Percentage of deaths in three age groups in countries of the Caribbean, around 1961

principal causes of death. In the Dominican Republic, the leading cause was the group of diarrheal disease (gastritis, enteritis, and related diseases) and 16 per cent of all deaths were included in this group. In contrast in the United States, the leading cause was diseases of the heart with 39 per cent of the deaths due to this cause, with cancer the second leading cause.

The completeness of death registration and of certification of the causes varies widely in these countries. For example, in some of the countries in the Caribbean area the cause for a high proportion of deaths is not known and the deaths are assigned to the group of "ill-defined and unknown causes." Thus the number of deaths assigned to specific causes and the death rates from specific causes are lower than they would be if the true situation were known.

Excessive mortality in infancy and early childhood continues to indicate important disease problems in these age groups. However, progress

is being made in the reduction of infant death rates and the death rates of children 1-4 years of age. Figures 4 and 5 show the trend of mortality in four countries for these two age groups. The reductions in mortality which have occurred in Mexico and Venezuela are clearly evident. The rates in the United States are very low although the relatively stationary infant death rate of around 25 per 1,000 live births is a matter of concern to health authorities. In a few countries of the world, the infant death rate is less than 20 per 1,000 live births, as in the Netherlands, Norway, and Sweden.

The declines in mortality are greater in children 1-4 years of age than in infants. This is the age group where the infectious and diarrheal diseases are leading causes of death. Reduction of mortality is effected rapidly by improvement of environmental conditions and by provision of preventive measures and medical services.

One of the goals of the decade of the Charter of Punta del Este³ is "to reduce the present mortality rate in children under 5 years of age by one-half." As pointed out in a document⁴ for the meeting at Punta

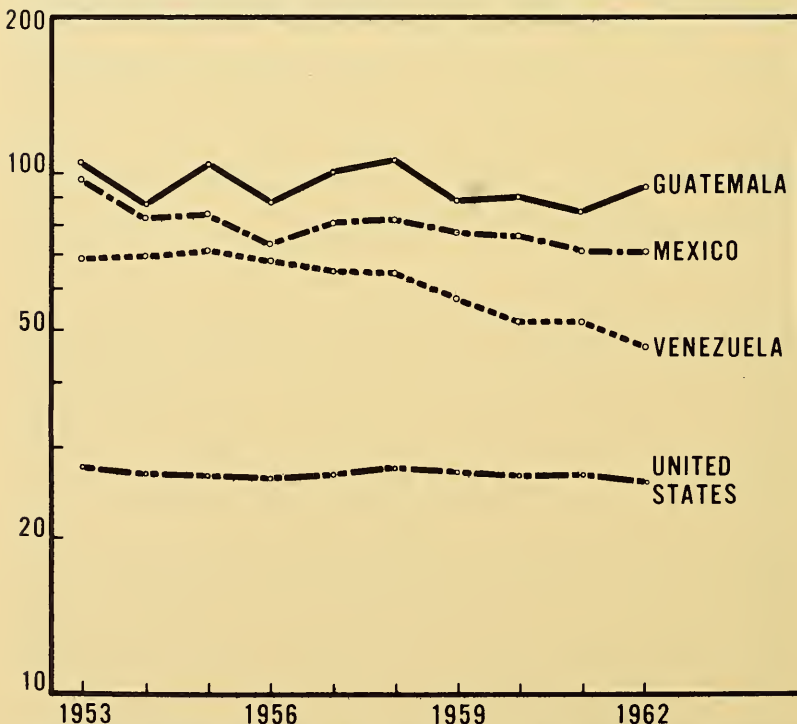


Figure 4—Deaths under one year of age per 1,000 live births in four countries of the Caribbean, 1953-1962

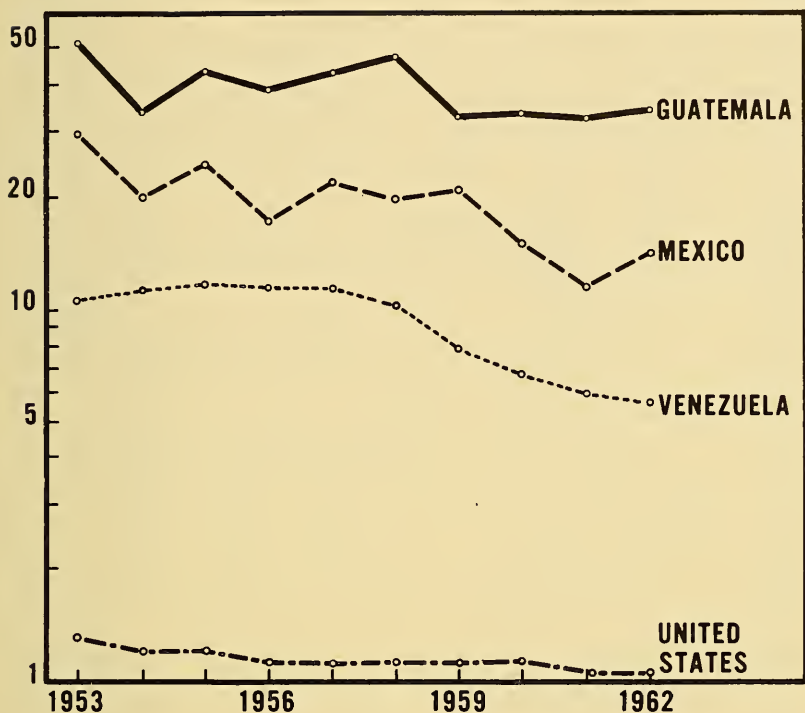


Figure 5—Deaths of children 1-4 years of age per 1,000 population in four countries of the Caribbean, 1953-1962

del Este, reduction of mortality under 5 years of age will contribute significantly to the increase of life expectancy at birth. The goal of the Charter in this respect is "to establish as a broad goal for health programs during the present decade an increase of five years in the life expectancy at birth of every person."

III. Morbidity

The available morbidity data are principally from reports of cases of notifiable diseases. Countries of the region send weekly, monthly, and annual reports of notifiable disease to the PAHO. A publication of the Organization's *Weekly Epidemiological Report*⁵ provides the health authorities with information currently regarding the quarantinable and other notifiable diseases in the Americas.

There are six quarantinable diseases, namely: cholera, smallpox, yellow fever, plague, louse-borne typhus fever, and louse-borne relapsing

fever. Cholera has not occurred in the Americas for over 50 years. Most of the countries of the Caribbean do not have cases of the quarantinable diseases. A smallpox eradication program has been successfully carried out in the Americas; and of the countries in the Caribbean area, Colombia is the only one with a few cases being reported. A few cases of jungle yellow fever occur in the jungle areas of Colombia and Venezuela. Also, a few cases of louse-borne typhus are reported in Mexico and Colombia. However, the principal notifiable diseases are the communicable diseases of childhood, such as diphtheria, measles, and whooping cough; the gastrointestinal diseases of typhoid fever and dysenteries; venereal diseases; and tuberculosis. The *Weekly Epidemiological Report* provides current data on notifiable diseases as well as reports of outbreaks of diseases such as encephalitis, poliomyelitis, and influenza.

Reports in 1963 and 1964 of outbreaks of dengue in the Caribbean have been of special interest. Dengue is a viral disease transmitted by the *Aedes aegypti* mosquito. Campaigns for eradication of this vector had been carried out in many of the islands and countries of the Caribbean area, which had resulted in the reduction and practical elimination of dengue. Unfortunately, resistance of the *Aedes aegypti* mosquito to insecticides resulted in increases in these mosquitoes in several islands. Beginning in March, 1963, an outbreak of dengue occurred in Jamaica which was followed by an extensive outbreak in Puerto Rico. In December, 1963, epidemics occurred in three other islands: Martinique, Antigua, and Curaçao. In 1964, reports of dengue have come from Dominica and Anguilla, and recently the outbreak has spread from the coast inland in Venezuela. Figure 6 shows the location in the Caribbean of these areas with outbreaks of dengue. Fortunately, dengue is a mild disease with very low fatality. This spread of dengue from island to island shows the importance of considering the problems of disease control for the entire area. Infectious diseases are spread rapidly from one area to another if the conditions are favorable. In this instance, the multiplication of the *Aedes aegypti* mosquito and the large susceptible population resulted in these outbreaks when dengue was brought into an area. Renewed efforts are now required for the eradication of this mosquito, which is also the vector of urban yellow fever, from the Americas.

Each year, the PAHO publishes an annual report with information regarding notifiable diseases in the Americas. The last report⁶ in this series, *Reported Cases of Notifiable Diseases in the Americas, 1962*, gives detailed information for the year with discussions of the situation regarding quarantinable diseases, arthropod-borne encephalitis, polio-

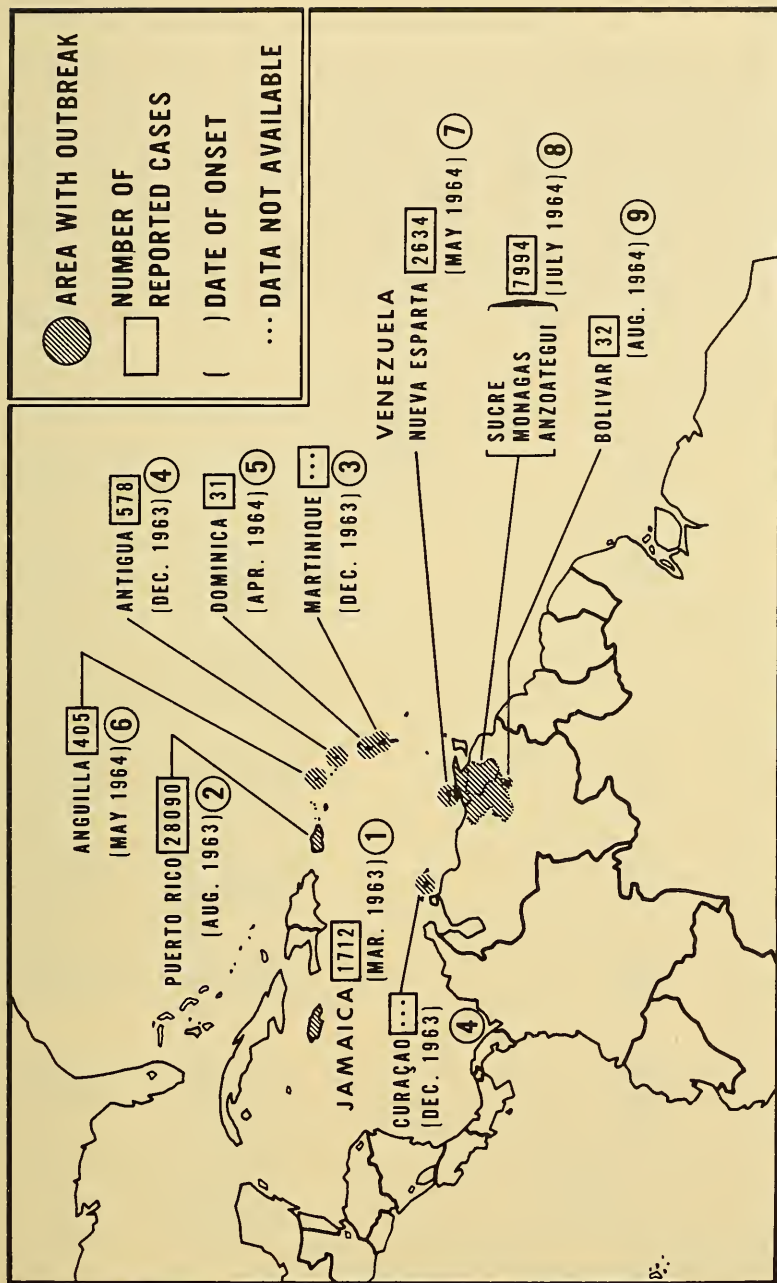


Figure 6—Epidemics of dengue in the Caribbean area, 1963 and 1964, as of November 12, 1964

myelitis, infectious hepatitis, measles, syphilis, and tetanus. Completeness of reporting varies according to the severity of the disease as well as according to the availability of medical facilities.

Malaria has been an important health problem throughout the Caribbean area. However, an eradication program is now under way. Although difficulties have been encountered due to the resistance of the mosquito to insecticides, progress is being made. Reductions in mortality from malaria are clearly evident in most countries. The program includes intensive case-finding programs with examination of approximately eight million slides for malaria parasites in blood films in 1963, and thus reporting of confirmed cases is more complete than in the past. The progress of this campaign is reported in documents of the PAHO⁷ and of the WHO. However, an example from the Caribbean area illustrates the successful campaign. In Jamaica, only five cases of malaria were reported in 1962 of which only two were confirmed, while in 1957 over 4,000 cases were reported. (Six cases have been reported for 1963, and one case to October, 1964). This island is in the consolidation phase and eradication of malaria will be completed shortly. (Two territories, Grenada and St. Lucia, have already achieved eradication, and in both Trinidad and Jamaica eradication will be declared the first of 1965.)

An important source of morbidity statistics for knowledge of health conditions is from patient records. Unfortunately, hospital morbidity statistics have not been developed and used for health planning in many countries. Because of the importance of hospital morbidity, the Report on Health Conditions provided data for a few countries which included Colombia with data from all hospitals and Venezuela from hospitals of the National Health Service. Hospital morbidity data for these two countries are based on diagnoses reported for discharges. Many hospital admissions are for deliveries and for complications of pregnancy and childbirth and account for 35 per cent in Colombia and 50 per cent in Venezuela.

From these two series, the importance of the infectious and parasitic diseases as causes of hospitalization is clearly evident. In Colombia, 9 per cent and in Venezuela 5 per cent of the hospitalizations were classed in the group of infectious and parasitic diseases. Also, nutritional deficiency states and anemias were important causes in both experiences indicating the seriousness of malnutrition in those areas. The group of diarrheal diseases—gastritis, enteritis, and related diseases—accounted for 3.4 per cent of the hospitalizations in both series. These data, although limited, are given as an example to point out the value of hospital morbidity data for understanding health problems in an area.

IV. Distribution of Physicians and Hospitals

The quality of morbidity and mortality statistics is dependent on the availability of medical facilities. Also the development of health programs for the control of diseases requires physicians, nurses, and other health personnel, hospitals, and clinics. To illustrate the situation in these Caribbean countries, Figure 7 gives the number of physicians per 10,000 population serving the population in the capitals and large cities and in the remainder of these countries. Data were available for 8 of



Figure 7—Physicians per 10,000 population in capitals and large cities and in the remainder of these countries, in the Caribbean, around 1962

the countries in the Caribbean area. The capitals and large cities had from 7 to 21 physicians per 10,000 population. In the remainder of these countries, the supplies of physicians were limited varying from 4.6 in Venezuela to 0.5 per 10,000 population in Guatemala. For the countries of Latin America for which data were available only 21 per cent of the population lived in the capitals and large cities while 54 per cent of the physicians were located there. Thus in considering health problems, the distribution of health manpower in rural areas and in small cities must receive careful study.

The situation regarding the availability of hospital beds is similar, as seen in Figure 8. Likewise, the beds are concentrated in the capitals and



Figure 8—Hospital beds per 1,000 population in capitals and large cities and in the remainder of these countries, in the Caribbean, around 1962

large cities so that in large areas of some of these countries, as in the Dominican Republic, El Salvador, Guatemala, Honduras, Jamaica, Mexico, and Nicaragua, the number of hospital beds per 1,000 population in rural areas were low varying from 0.6 to 1.7.

V. Improvement of Vital and Health Statistics

Although the available morbidity and mortality data are valuable in indicating health problems, deficiencies in the quality of the data due in large part to limitations in health manpower and health facilities must be recognized. One of the programs of the Organization is directed to the improvement of health statistics. Added emphasis and impetus have been given to this by the recommendation of the Charter of Punta del Este "to improve the collection and study of vital and health statistics as a basis for the formulation and evaluation of national health programs." Statistical consultants of the Organization provide assistance to National Health Services in the development of their statistical programs. Emphasis has been placed on the education and training of statisticians for service in health programs. Over 350 statisticians have been prepared in special courses in the School of Public Health of the University of Chile. In 1964, training for statisticians was carried on in Schools of Public Health in five countries: Argentina, Chile, Colombia, Mexico, and Peru.

Recently, the Organization has emphasized the improvement of hospital statistics, and training programs are recommended in this field. The Regional Advisory Committee on Health Statistics in its Third Report⁸ gave special attention to hospital statistics. It is hoped that progress will be made for the improvement of medical records in hospitals and for the development of hospital statistics. Such data are urgently needed for use in the administration of hospitals as well as for national health planning.

The development of vital and health statistics is an essential and integral part of the health program. Only through teamwork can these essential data on morbidity and mortality be collected and used for progress in many important fields.

NOTES

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2. *Summary of Reports on the Health Conditions in the Americas, 1950-1953*, Pan American Sanitary Bureau, Scientific Publications No. 25 (1956), *Summary*

of *Four-Year Reports on Health Conditions in the Americas*, Scientific Publications No. 40 (1958); *Summary of Four-Year Reports on Health Conditions in the Americas, 1957-1960*, Scientific Publications No. 64 (1962).

3. *Alliance for Progress*, OAS Official Records OEA/Ser. H/XII.1, Pan American Union, Washington (1961).

4. Horwitz, A., and Puffer, R. R., "Extension of Life Expectancy, A Goal for Health Programs," *Boletín de la Oficina Sanitaria Panamericana*, Vol. 54, No. 1 (1963).

5. *Weekly Epidemiological Reports*, Pan American Health Organization.

6. *Reported Cases of Notifiable Diseases in the Americas, 1962*, Pan American Sanitary Bureau, Scientific Publications No. 102 (1964).

7. *Report on the Status of Malaria Eradication in the Americas and Estimated Requirements for the Special Malaria Fund of the Pan American Health Organization*, Pan American Sanitary Bureau, CD 15/5 (1964).

8. *Regional Advisory Committee on Health Statistics, Third Report*, Scientific Publications No. 103 (1964).

Werner Ascoli: NUTRITIONAL DISEASES IN THE
CARIBBEAN

NUTRITIONAL DEFICIENCIES represent one of the major health problems in the Caribbean area, as they also do in most of the so-called underdeveloped areas of the world. However, this problem has not received adequate attention from government, especially health authorities, until very recently, even though some of the very earliest descriptions of the protein-calorie deficiency syndrome came from this area [Patrón Correa in 1908 (Mexico), Carulla (Mexico), Castellanos (Cuba), Cofiño and Arguedas Klee (Guatemala), Goens Rosales (El Salvador), Franco (Venezuela), and Vidal (Honduras)]. The infant and 1-4 year mortality rates in the Caribbean area are among the highest in the world. It has been repeatedly confirmed that an area with a high mortality in the 1-4 year age group also will suffer from a severe nutritional problem.

It will now be attempted to present some of the nutritional problems of the area, their causes, and possible measures of prevention.

I. Endemic Goiter

Every country in this area, with the exception of only a few of the islands, has to cope with a severe endemic goiter problem. According to WHO, endemic goiter represents a public health problem whenever its prevalence amounts to more than 10 per cent. It is caused by an insufficient intake of iodine, which may be lacking in soil or water because of excessive erosion. Cretinism and deaf-mutism, considered to be sequelae of endemic goiter, have been reported in most of these countries.

II. Vitamin A, Riboflavin, and Iron Deficiencies

Numerous dietary surveys in Central America (Flores) and other countries (Haiti, Venezuela, Colombia, Puerto Rico) have shown sporadic areas in which these deficiencies occur. In many rural areas, vitamin A deficiency is considered as an important cause of permanent blindness through the production of keratomalacia in preschool children (Escapini, Incap, Bengoa). In clinical-nutritional examinations Bitot spots, xerophthalmia, and keratomalacia are not encountered very frequently. Dietary vitamin A deficiency fluctuates with seasons, and liver stores in most cases will be sufficient to maintain serum vitamin A levels above clinical margins.

Riboflavin deficiency, although present, does not represent a serious public health problem. Angular stomatitis and seborrheic lesions of the outer angle of the eye and of the naso-labial region are frequently encountered in clinical-nutritional surveys. Iron deficiency becomes an important problem only in conjunction with hookworm infestations.

III. Protein-calorie Malnutrition

By far the most important nutritional problem in the Caribbean area is protein-calorie malnutrition, often expressed by its two extreme forms of kwashiorkor and marasmus. Although exact figures are not available, it has been calculated that throughout the Caribbean area 3-4 per cent of all children under 5 years of age suffer from one or the other of these severe forms of malnutrition.

Much more important, however, is the subclinical form of protein-calorie malnutrition. Retardation in height, weight, bone development, head circumference, and motor development are its results. In the Caribbean area, children are born with a normal weight according to United States standards, and will follow the United States growth curves for the first 4-6 months of life, while the child is receiving adequate nutrition from the mother's milk. Because supplementary feeding is begun very late and in inadequate amount and quality, growth slows down and almost stops between the ages of 1 and 4 years. After the fifth year, the child adapts to the family diet and begins to grow at a rapid rate, but never catches up to the standard growth curve and thus remains permanently lighter and shorter than expected. One might think that being shorter and lighter may be of relatively little importance, but when the same retardation occurs in motor and mental development, then the problem is very serious. Preliminary studies in Mexico (Cravioto),

Guatemala (Cravioto), and Uganda (Dean) indicate that these latter two—motor and mental development—are also permanently retarded in chronically malnourished children. The central nervous system is practically fully developed at 4-5 years of age, and during this preschool age is where most of the nutritional insults occur.

Another factor of great importance in chronic protein-calorie malnutrition is the synergistic effect of infections on the nutritional status. It has been well established that most infections, even as minor as a yellow fever vaccination, will produce a negative nitrogen balance, probably due to toxic protein destruction. Furthermore, anorexia, vomiting, and diarrhea, which often accompany infectious diseases, reduce the nutrient intake, thus increasing the nutritional problem. Longitudinal studies on the interrelation between nutrition and infections in Guatemala have shown the very high incidence of diarrheal disease and respiratory infections in the preschool age group. It was also observed that most of the cases of severe malnutrition appear shortly after the infectious illnesses have reached their seasonal peak.

The French pediatrician Mouriquand, during the early years of the present century, called attention to three forces of mortality in children: the congenital force taking its toll very early, the infectious force coming from 1-3 years, followed shortly by the nutritional force. Most technically developed areas have eliminated the second and third forces, thus reducing their mortality to the present low rates. In the area under discussion, we still are at a stage which others conquered long ago.

IV. Production - Availability - Utilization - Nutrition

The first two of these have been described already in detail at this Conference, but I should like to emphasize again the great problems that both of these factors pose in regard to the solution of nutritional problems. Time and again we have seen land for food crops being displaced by cash crops and the waste of foods because of poor transportation and marketing reducing its availability to large groups of population.

For example, in El Salvador (1951 and 1959) the following data for food and cash crops make this point evident.

Utilization of food can be considered from two points of view. First, we should consider the external factors, such as purchasing power of the family and cultural habits of the population. When 60-70 per cent of family income has to be used for food, instead of the recommended 20-25 per cent, it is quite obvious that many food products are completely out of the purchasing power of these populations. Meat, eggs, milk, and

	AREA PLANTED (Hectares)		CROP (1000 Kg)	
	1951	1959	1951	1959
Corn	153,242	178,220	177,790	150,554
Beans	24,061	21,529	26,634	10,233
Rice	15,339	9,410	20,286	12,202
Cotton	29,852	56,689	9,821	41,946
Sugar	6,093	7,450	27,358	47,639

other protein-rich foods, although available on the market, cannot be purchased by a large proportion of the population. National food balance sheets often give the impression that ample food is available in a country as a whole, but no mention is made of its utilization. The cultural habits may play an even more important role in the utilization of foods. Among these, we may mention taboos, erroneous weaning habits, dietary restrictions during illness, indiscriminate use of laxatives, and many others. For instance, in many areas of Central America meat is not given to small children for fear that it cannot be digested by them, instead they are given only the broth. Laxatives and vermifuges are administered for many illnesses on the theory that intestinal parasites are the cause.

Secondly, we also should consider the internal factors in utilization of nutrients. The absorption and transport of vitamin A, for instance, is reduced in the absence of certain proteins and lipids. The effect of the deficiency of the intrinsic factor in vitamin B12 utilization is well known. Atrophy of the intestinal mucosa and a decrease of intestinal enzymes in the severe forms of protein malnutrition causes a decreased intestinal absorption of most nutrients.

The nutritional problems of the Caribbean area thus appear to be very complex and serious. In trying to find solutions, all the factors involved have to be taken into consideration. Distribution *en masse* of food supplements alone, as has been done in the past, may slightly alleviate some situations but will certainly not solve the problem. Intensive research and applied measures in the fields of agriculture, education, economics, and public health to implement applied nutrition programs are the only means to attack the problem by its roots.

At the Institute of Nutrition of Central America and Panama (INCAP) two approaches to the nutritional problem for the Central American area have been used. One consists in the development of vegetable mixtures of high protein content for human consumption, which has resulted in Incaparina (a mixture of cottonseed flour, corn flour, with the addition of torula yeast, synthetic vitamin A, and calcium carbonate). Prerequisites for such mixtures are that they should consist of local products,

be cheap, and be acceptable to the poor rural population. At the present time, Incaparina is being commercially produced in Mexico, Guatemala, and Colombia; and it is expected that during 1965 several other countries in the area will follow.

However, a more permanent solution involves a change in the dietary pattern of the population, and it has been considered that this can only be accomplished by means of intensive programs of nutrition education. WHO, FAO, and UNICEF have developed one such program in Central America through the cooperation of these three agencies with the ministries of Education, Agriculture, and Public Health. In the Public Health agencies this type of program consists of the adequate treatment of nutritional deficiencies and the prevention of malnutrition by health education of mothers who attend these agencies for prenatal and postnatal care, well baby clinics, and others. Most important, in the schools nutrition education is accomplished through the establishment of school vegetable gardens in cooperation with the agricultural extension agent, which will teach the school child improved agricultural methods and the use of new products, fertilizers, and pesticides. The products of this school garden are used in classroom teaching of nutrition and in the preparation of the school lunch. Obviously, results from such a program cannot be expected immediately, but will take a long time, maybe several generations. It is thought that the children of the school children who are now receiving this training will already have a better chance to pass through their preschool years without the severe effects of malnutrition. Five Central American countries have established pilot programs on these general lines, expecting to expand them in the future. It is gratifying to see how adults, school children, and teachers have taken up the new ideas presented to them and how they expect to improve their situation through such cooperative programs.

In regard to specific localized nutritional deficiencies effective and easily applied measures are available. Iodine can be supplied through its addition to salt. In Guatemala, for instance, the prevalence of endemic goiter has decreased from 38 to 17 per cent after only 5 years of effective iodization of salt. Vitamin A deficiency can be prevented through its administration to vulnerable groups of population or by means of increasing production of natural sources of carotenes.

The Caribbean area has not kept up its food production in relation to its tremendous population growth. In fact, in many areas food availability is less now than 10 years ago. Within the next 20 or 30 years, famine conditions will prevail in the Caribbean unless the nutritional situation can be effectively controlled.

Federico Hernández-Morales: INTESTINAL DISORDERS IN THE CARIBBEAN

THE CARIBBEAN and its bordering lands lie wholly within the tropics with a hot and wet climate, ideal for the transmission of bacterial, viral, and parasitic diseases.

I. Disorders of Children

In children especially, acute intestinal disorders may be benign, moderate, or severe in intensity. The endemic diarrheal states are generally acute. The acute diarrheal diseases, as the upper respiratory infections, constitute a clinical syndrome with a characteristic pattern comprising a small group of well-known pathological entities, a large group of infectious diarrheal states so far undifferentiated, and an indefinite noninfectious group. The most common of the bacterial pathogens appear to belong to the colibacilli group followed by the shigella and staphylococci groups. In many children with acute disorders of the intestines, the bacteriological study of the stools reveals no apparent pathogens at all. In others, intestinal disorders can be outstanding manifestations of some other disease; i.e., acute pyelonephritis, eruptive fevers, acute pneumonitis, acute meningitis, and others. Measles is frequently accompanied by very active diarrhea. Rhinovirus, an upper respiratory tract pathogen, has produced diarrhea in human volunteers. There is an epidemic type of acute diarrhea in children which can be of viral etiology, but lack of adequate laboratory facilities has hampered the elucidation of the etiological agent or agents.

Intestinal parasitism in children may be ushered in by acute diarrhea.

Trichuriasis, giardiasis, necatoriasis, balantidiasis, amebiasis, strongyloidiasis, and schistosomiasis are well-known examples.

Among the less well-explained causes of acute intestinal disorders in children, the sudden cessation of breast feeding and the initiation of a poorly digestible diet appear to be of great importance. The incidence of diarrhea is low during the first six months of life, the breast feeding period. Diarrheal disorders become prominent from the age of six months to the age of two years and are more common and severe among malnourished children. As the child grows older there is a progressive decrease in frequency of diarrhea.

Chronic intestinal disorders in children occur in relatively few, especially in underdeveloped countries. Parasitism appears to be of great importance. *Trichuris-trichiura* is present in many children and massive infestations frequently occur. Since these parasites are difficult to eradicate, chronic diarrhea is produced which may bring about pronounced emaciation. Necatoriasis, ascariidiasis, giardiasis, strongyloidiasis, amebiasis, schistosomiasis; any one may perpetuate an inflammatory state of the intestinal tract.

Malnutrition and/or undernutrition appear to be of importance not only in provoking and prolonging intestinal disorders but also in contributing greatly to intensify the manifestations initiated by bacterial, viral, or parasitic pathogens. Symptoms are frequently milder or less severe in children who are malnourished but they tend to persist longer with occasional exacerbations.

The role of malabsorption states in children has not received adequate study until recently but such states do not appear to be a common primary cause.

Among the avitaminoses, fortunately rapidly disappearing, multiple deficiencies may be of importance in certain areas. In children who have been on a strictly milk diet for a prolonged period of time, chronic intestinal disorders may occur due to deficiencies in folic acid, iron, and vitamin C.

There appears to be little mucoviscidosis and very rarely exudative enteropathies.

II. Disorders of Adults

In adults the intestinal disorders have frequently a similar etiology. The acute disorders are most frequently due to viruses when they appear in epidemic forms. Shigellosis is seen off and on, rarely in epidemics and mostly among hospital or rest-home populations. The same is true

for salmonellosis. Systemic diseases in the adult are not prone to be ushered in with acute intestinal disorders as in children.

Irritating drinks and foods appear to be of importance in bringing about acute intestinal disorders specially among tourists regardless of the country visited. Food intoxication (a misnomer) is the cause of acute and at times severe intestinal disorders. The most common offender is the exotoxin of staphylococci contaminating the food taken. Food handlers with skin or upper respiratory infections are usually to be blamed. Hundreds of people can be acutely involved in a few hours. Poisonous food substances can cause severe acute intestinal disorders.

Acute intestinal disorders in the adult can also be caused by intestinal parasites. *Trichuris-trichiura* does not appear to play such an important part as in children, but necatoriasis, ascariidiasis, strongyloidiasis, giardiasis, amebiasis, balantidiasis, and schistosomiasis can frequently be incriminated. Three of these can produce extraintestinal lesions of great importance and severity.

The chronic intestinal disorders in adults are frequently secondary to intestinal parasitism and/or malnutrition or undernutrition. Again, necatoriasis, ascariidiasis, strongyloidiasis, giardiasis, amebiasis, balantidiasis, and schistosomiasis are the main offenders. Bacteria appears to be of importance in institutions, especially in some asylums where cross-infection is rampant. Viruses are apparently not involved in the chronic intestinal disorders of adults.

Avitaminosis in certain groups may be of importance in the poorly developed countries. In the better developed ones the use of vitamins as food supplements has become so popularized that overt avitaminosis is seen only in malnourished chronic alcoholics.

Among the middle-class group chronic intestinal disorders may frequently be due to what is at the present known as the irritable bowel syndrome. This disorder does not appear to be primarily related with bacterial, viral, parasitic, or mycotic agents. Its protean manifestations may at times confuse the most experienced clinician.

The group of the malabsorption disorders is a very fascinating one. Described for the first time in the island of Barbados by Hillary in 1779 and rediscovered in 1908 in Puerto Rico by Ashford, it might play a role of greater importance than the one usually attributed to it. Modern diagnostic screening methods are revealing more and more disorders of malabsorption in that area of the world.

Chronic idiopathic ulcerative colitis is also encountered occasionally, but Crohn's disease or segmental ileojejunitis is only rarely seen. The etiology of both remains unknown.

Malignancy of the digestive tract has, of course, to be considered and ruled out by proper diagnostic procedures in all adults with chronic intestinal disorders.

Diverticulosis and diverticulitis after the age of 50 is obviously of importance. Diverticulosis is frequently diagnosed in the adult population and may be accompanied by significant morbidity and mortality.

Allergy may be of importance in the initiation and perpetuation of intestinal disorders in children and adults. The elimination of a food or group of foods may bring about happiness again to a chronic sufferer.

Tuberculosis of the intestines is rapidly disappearing in the developing countries due to the eradication of tuberculosis in cattle herds and to the lower incidence of tuberculosis in general.

III. Etiology of Nonparasitic Intestinal Disorders

In spite of advances in the laboratory diagnosis of intestinal disorders, the truth is that only a small group of diarrheal disorders can be classified as pathological entities and those that have been identified as such cannot be distinguished from the immense majority of undifferentiated intestinal disorders. It is important to remember that the isolation of a pathogen from the feces of a patient does not establish the etiology. In at least 12 per cent of patients with diarrhea studied in Guatemala more than one pathogen was isolated. This makes it difficult to establish the cause. Frequently bacterial pathogens are cultured in patients harboring also enteric viruses and parasites. The diarrheal disorders produced by shigella, salmonella, *Escherchia coli*, and *E. histolytica* are only a small part of the whole group, rarely being higher than 20 per cent. The great majority of diarrheal states are probably of infectious nature, but not all. Man constitutes almost the only reservoir, but salmonella infections can be contracted from animals.

IV. Symptomatology

Bacteria

Acute, explosive symptoms may be ushered in by the presence of bacteria and/or their toxic products. Severe dehydration and electrolyte imbalance may occur rapidly with consequent prostration and shock. In children these symptoms may appear with unusual suddenness accompanied by a high morbidity and mortality. Diarrhea may be profuse and many times mucoid and bloody. The intestinal pains produced may be intense before, during, and after each bowel movement. Accompanying

these symptoms, there are systemic manifestations such as fever, headache, general aching, and discomfort. In very young infants drowsiness and meningeal symptoms may take place. In the aged, in the chronically debilitated, in the poor risk patient, the seriousness of such infections cannot be overemphasized.

When the infection becomes chronic, symptoms occur, but with less intensity or severity. The daily loss of important food elements and the chronic inflammatory changes produce anemia, loss of weight, and vitality.

Parasites

Symptoms brought about by the presence of intestinal parasites may vary from practically none to intense discomfort and diarrhea, depending upon the intensity of the infestation and the susceptibility of the host. In children the intestinal manifestations are more severe and devastating than in adults, and chronicity may hamper the normal development into adulthood. Nausea, vomiting, decreased desire for food, abnormal aches or pains difficult for children to describe, diarrhea with or without mucus and blood, intestinal obstruction, prolapse of the rectum, and even perforation and peritonitis may appear. On many occasions large round worms freely moving about within the abdominal cavity have been seen while operating a child for acute perforated appendicitis. These same round worms may entangle together forming masses which obstruct the intestine requiring emergency surgical operations to save the life of the afflicted child. Tiny, microscopic parasites like the ameba (*E. histolytica*) or the balantidium have the property of dissolving tissue and therefore producing perforations. Still others may provoke intensive thickening of the intestinal wall with consequent narrowing and symptoms of partial obstruction.

In other instances, inflammation of the intestinal outlet produces formation of fistulous tracts and abscesses which can produce prolonged suffering.

Virus - Viral Infections

Viral intestinal disorders are characterized by a flu-like general discomfort, with prominent bony aches at times, lack of appetite, nausea and vomiting, little or no abdominal pain, profuse watery diarrhea, without blood or mucus and much peristaltic rushes and borborymi. Severe dehydration and electrolyte imbalance can be rapidly produced in young infants and children. Diarrhea will continue for several days after the nausea and vomiting are relieved. In some patients the diarrhea may continue for weeks or even months.

V. Transmission

The transmission of acute disorders secondary to bacteria or parasites is due to lack of proper hygiene, poor living standards and education, inadequate government supervision, and, most important, to that natural tendency of *homo sapiens* to be filthy.

In the perpetuation of parasitic diseases, the human being is the one to be blamed most. Anyone who has had the experience of bringing up children knows how difficult a task it is to keep them clean. We, as adults, continue to do many of the careless things we did as children; and in so doing we help to perpetuate a group of diseases which could be controlled. In the life cycle of parasitic diseases, the human being is the final host and if the intestinal wastes were properly taken care of, parasitism would not be so prominent. All the known methods of transmission are related to the disposal of human feces. But we have not been able to control such disposal in spite of intensive indoctrination. That is why we continue to have such a tremendous incidence of intestinal parasitism. The same is true about bacterial and, to the same extent, about viral diseases. Latrines are apparently inefficient as a method of control of infections among children but they are of value in the adult group.

The occurrence or development of diarrhea in several members of a family or community suggests that milk or water has been involved in the epidemic.

In the usual family outbreak of infectious disorders a well-known pattern of transmission is observed. One of the children going to school will develop the illness and then the rest of the crowd becomes ill, the older members being spared or less affected. In some countries, like Guatemala, the onset of the intestinal disorder can be traced to a child less than one year of age. An adult or adolescent child may have the disease and become a carrier and therefore will be capable of transmitting the infection to other members of the family.

A poor sanitary environment may enhance a low virulent pathogen. Likewise a nonpathogen may become infective in the presence of poor nutrition and debilitating states.

VI. Susceptibility

The development of an intestinal disorder depends upon the susceptibility of the individual, the pathogenicity of the agent, the state of nutrition of the host, the dose of the infecting agent, and the environmental

sanitation. The absence of secondary attacks in older members of a family or community suggests the development of immunity to the infecting pathogens. Outbreaks of diarrheal diseases or of measles occur approximately every three years.

VII. Diagnosis

From the clinical point of view the acute diarrheal diseases are a syndrome with universal manifestations, varying degree of severity, characteristic area and environmental differences. The clinical entities cannot, in general, be differentiated in any particular situation although there are etiological differences.

In our experience the etiological diagnosis of acute intestinal disorders in adults can be suspected on the basis of the history, physical, and sigmoidoscopic findings, macro- and microscopic examination of the bowel movements, and routine white blood cell study. The onset of a mucopurulent or bloody exudate or discharge is more common in the specific than in the nonspecific diarrheal states. In children the etiological diagnosis cannot usually be suspected clinically, and one has to depend upon special laboratory procedures. In both, children and adults, the diarrheal disorders produced by viruses are frequently accompanied by upper gastrointestinal symptoms but rarely by mucoid or mucopurulent bloody discharge.

VIII. Mortality

The number of deaths due to all forms of dysentery in the Caribbean countries varies from a low of 2 or 3 to a high of 5,559 (Table 1). It is probable that many more deaths occur than those reported. Typhoid and

TABLE 1
NUMBER OF DEATHS DUE TO ALL FORMS OF DYSENTERY IN THE
CARIBBEAN COUNTRIES, 1959-1960

Colombia	1,169	Guadalupe	7
Costa Rica	60	British Honduras	2
Cuba	39	Martinique	....
Dominican Republic	258	Netherland Antilles	29
Guatemala	1,803	Puerto Rico	....
Haiti	13	Virgin Islands (USA)	....
Honduras	136	Antigua	2
Mexico	5,559	Dominica	63
Nicaragua	34	Grenada	17
Panama	27	Jamaica	13
Venezuela	556	Santa Lucia	2
Trinidad and Tobago		30	

paratyphoid fevers and other salmonella infections continue to be rampant in some countries.

Gastritis and enteritis and/or certain diseases of early infancy are the main causes of deaths in Colombia, Costa Rica, Haiti, Mexico, Nicaragua, Panama, Dominican Republic, Guatemala, and Venezuela. The diagnosis of gastritis is, of course, usually made on vague flimsy symptomatology.

In Guatemala 27 per cent of all deaths are attributed to infantile diarrhea, 25 times as high as in the United States. The mortality during the preschool age is 519 times as high. Diarrhea contributes greatly to the increase in mortality in patients with other diseases. The role played by intestinal parasitism is difficult to ascertain. According to studies carried out in Puerto Rico there is still extensive and intensive parasitism.

IX. Treatment

The most important treatment is preventive. Once the disorder has started it is fundamental to maintain adequate liquid, electrolyte, and caloric balance. The use of antimicrobial agents has not met with the expected success according to studies carried out. It is most important to deal with carriers promptly and effectively.

X. Summary

The intestinal disorders in the Caribbean countries are very common. Parasitism is rampant. Bacterial and viral agents are frequently cultured. The vast majority of intestinal disorders have no apparent etiology. Diarrheal disorders in children are uncommon during the breast feeding period. The most important therapy is preventive. The maintenance of adequate liquid, electrolyte, and caloric balance is the main therapeutic pillar. Although antimicrobial agents are not lifesaving alone they may be of definite help in some of the diarrheal disorders such as shigellosis and typhoid fever. Tetracyclines are the drugs of choice for the former; chloramphenicol and ampicillin for the latter. Since ampicillin appears to be as effective as chloramphenicol and with a much lower toxicity it should be the drug of first choice in the treatment of typhoid fever. A vast amount of work remains to be done to make the Caribbean countries healthier.

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Part V

HEALTH ADMINISTRATION

**Antonio Ríos Vargas: STATUS AND NEED OF MEDICAL
CARE FACILITIES IN THE CARIBBEAN**

DIFFERENT ETHNICAL GROUPS live in the area of the Caribbean: Negroes, Caucasians, Indians, Asiatics, and mixtures of these races. One of the most important problems related with medical care that these countries have to face, especially the Latin American population, is the phase of infrastructure in which they are still living. This phase is related to the development of communications, electricity, and education.

Besides, in these countries 56.7 per cent of the population is dedicated to agriculture, and the mobilization of the people to medical care facilities is difficult. Only the 17 per cent of the population who make their living from industry and the 23.3 per cent dedicated to commerce can attend these centers. That, in a way, can justify the high rates of morbidity and mortality in these countries. Besides, the birth rate is 43 per 1,000 population and there are some countries that have poor birth records. In some countries the birth rate is 50 per 1,000 population.

I

It is quite difficult to describe in such a short paper the medical situation in this great area of America. On the other hand, the social, economic, and ethnic differences and the various ecological conditions compel us to make a selection of those countries that can be of most interest.

Since Florida, the Bahamas, Puerto Rico, the Lesser Antilles, Jamaica, the Canal Zone, and British Honduras have more economic resources and better medical care, they will form a separate group. The rest of

the countries can form another group due to the special way they have faced the problem of medical care in their communities, and the resources they have used for this purpose.

It is important to know that in this area live 58 million people, 83.5 per cent of whom (that is 49 million) belong to Latin American countries. As a demographic reference we can say that all the Latin American countries of this area belong to the underdeveloped group and the population has an explosive birth rate. All of them have a minimum of resources for medical care. Only a few have adopted a system which will permit them to use their resources for this type of service.

These countries spread their human and economic resources among several institutions, such as the Public Health Ministry, Social Security, subsidy institutions, and private institutions without planning or programming.

These countries have been developing their material resources slowly but constantly and in an indiscriminate way. They have built hospitals of different capacities and health centers of various types that in many cases have gone beyond the requirements of the community, with damage to their economy.

In relation to human resources they have a deficit. There are not enough doctors, graduate nurses, aid nurses, or technicians. This lack of human resources is more apparent because of the diversity of services that these countries provide. This has caused the appearance of the so-called "taxi doctors," that is, doctors who have to work in four or five places in order to make a decent living. They have to run from one place to another to accomplish their jobs. The Social Security institutions have to be blamed for this problem, because they are one of the main causes of the poverty of the medical group, since private practice becomes less and less as the number of the insured people increases. In these countries none of the institutions for medical care has done anything to solve this abnormal and progressive situation that concerns not only the medical profession but also the technicians and nurses.

II

The observations of the different countries of this area show us that there is no uniformity in the medical care of their communities. Very often we find great differences among these countries and even in the same ones. So we can see large congregations of human, material, and economic resources, and wonderful hospitals, too well-equipped and with excessive budgets. On the other hand, in some other areas there are communities without any resources for medical care whatever.

Nevertheless, it is important to say that even with different economic potentials, all Latin American countries of the Caribbean are trying to do their best, and are improving the quality of their medical services, eliminating little by little all the problems they have been facing.

Certain countries such as Venezuela, Costa Rica, Cuba, Puerto Rico, and Mexico have established uniform methods for the medical care of their population. It is important to observe the coordinated hospital systems that Venezuela, Puerto Rico, Salvador, and the Dominican Republic are developing. Their programs of medical care tend toward a regionalization with a coordinated planning of medical units. These medical units are always the result of the needs of the community and a consequence of an analysis of their resources. They are planned for ten years. As for Cuba, we can say that in just a few years the government has developed all the resources for medical care into a program of Public Health which system may be seen from the WHO publication, Bulletin Number 63. Mexico has made an effort to solve this serious problem as can be seen through a paper on Medical Administration in Public Health, published in the Graduate Course in Hospital Administration of Mexico.

III

Without further discussion on my part I wish to present the following statistics which illustrate and expand the theme of this paper.

GREATER ANTILLES

CUBA		JAMAICA COMMONWEALTH	
ISLA DE PINOS (CUBA)			
Grand Cayman	} UNITED KINGDOM	ESPAÑOLA	{ HAITI { Tortue Gonave
Little Cayman			
Cayman Brac			
PUERTO RICO U.S.A. { Mona Culebra Vieques		{ DOMINICAN REPUBLIC	

LESSER ANTILLES

I		II		III		IV	
Bahamas U. K.		Virgin Islands		Windward		Leeward	
Great Bahama	St. Thomas	U.S.A.	Anguilla	U.K.	Margarita	Venezuela	
Little Abaco	St. John	U.S.A.	St. Martin	France	Tortuga	Venezuela	
Great Abaco	St. Croix	U.S.A.		and Neth.	Orchila	Venezuela	
Andros			St. Barthélemy	France	Los Roques	Venezuela	

I		II		III		IV	
Bahamas U. K.		Virgin Islands		Windward		Leeward	
Eleuthera	Tortola	U.K.	St. Eustatius	Nether-			
Long Island	Virgin	U.K.		land	Bonaire	Netherlands	
Watling	Gorda	U.K.	St. Kitts	U.K.	Curaçao	Netherlands	
Crooked	Anegada	U.K.	Barbuda	U.K.	Aruba	Netherlands	
Acklins			Nevis	U.K.			
Mayaguana			Montserrat	U.K.			
Great Inagua			Antigua	U.K.			
Caicos			Guadeloupe	France			
Turks			Marie Galante	France			
			Dominica	U.K.			
			Martinique	France			
			St. Lucia	U.K.			
			St. Vincent	U.K.			
			Barbados	U.K.			
			Grenadines	U.K.			
			Grenada	U.K.			
			Tobago	U.K.			
			Trinidad	U.K.			

This area is formed by 35 countries with a total population of 58,391,613 inhabitants. Of this population 48,966,161, or 83.5 per cent, belong to Latin American countries. 56.7 per cent of this population, or 23,108,044, live in rural areas. Of the 35 countries which form the Caribbean area, only 6 have more than 3 million inhabitants.

POPULATION CENSUS DATA 1960-1962. ANNUAL GROWTH RATE
IN THE CARIBBEAN

COUNTRY	CENSUS DATE	POPULATION	ANNUAL GROWTH RATE
Colombia	1960	14,132,000	2.7
Costa Rica	1963	1,325,155	4.0
Cuba	1960	6,797,000	2.1
Guatemala	1964	4,278,000	3.0
Haiti	1960	4,156,000	3.0
Honduras	1961	1,883,362	3.0
Jamaica	1960	1,613,880	1.3
Nicaragua	1963	1,524,027	3.3
Panama	1960	1,075,541	2.9
Dominican Republic	1960	3,013,525	3.5
Trinidad and Tobago	1960	827,957	2.9
Venezuela	1961	7,523,999	4.0
Antigua	1960	54,304	1.9
Netherlands Antilles	1960	188,914	3.1
Barbados	1960	232,333	1.3
British Honduras	1960	90,381	3.1
Bermuda	1960	42,640	1.3

COUNTRY	CENSUS DATE	POPULATION	ANNUAL GROWTH RATE
Dominica	1960	59,916	1.7
Grenada	1960	88,677	1.5
Guadeloupe	1961	283,000	2.9
Bahama Islands	1960	105,000	3.2
Cayman Islands	1960	7,600	0.3
Turks and Caicos Islands	1960	5,716	2.1
Virgin Islands (U.S.A.)	1960	32,099	1.9
Virgin Islands (U.K.)	1960	7,340	0.9
Martinique	1961	292,000	2.8
Montserrat	1960	12,108	1.2
Puerto Rico	1960	2,349,544	0.6
St. Kitts, Nevis and Anguilla	1960	56,591	1.5
St. Vincent	1960	79,948	1.9
St. Lucia	1960	86,108	1.5
Canal Zone	1960	42,122	2.2
Florida		5,459,000	....
Yucatán	1960	647,282	3.4
Quintana Roo	1960	60,666	2.7
Total		58,391,613	

Source: Las condiciones de salud en las Américas 1961-1962. P.H.B. who Publicaciones Científicas No. 104. August, 1964. Census.

FIVE OF THE MOST IMPORTANT CAUSES OF DEATH AND RATE PER
100,000 POPULATION IN 12 COUNTRIES OF THE CARIBBEAN, 1962

COUNTRY	CAUSES OF DEATH	NUMBER	RATE	% OF THE TOTAL NUMBER OF DEATHS
COLOMBIA	All causes	177,208	1199.9	100
	Gastritis, duodenitis, etc. (543, 571, 572)	18,852	127.6	10.6
	Birth Injuries (760-776)	18,468	125.0	10.4
	Influenza and Pneumonia (480, 483, 490, 493)	13,696	92.7	7.7
	Heart Diseases (410, 443)	11,262	76.3	6.4
	Acute Bronchitis (500, 502)	8,564	58.0	4.8
COSTA RICA	All causes	10,861	852.5	100
	Gastritis, duodenitis, etc. (543, 571, 572)	1,582	124.2	14.0
	Influenza and Pneumonia (480, 483, 490, 493)	1,001	78.6	9.0
	Birth Injuries (760, 776)	952	74.7	8.8
	Malignant neoplasms (140, 205)	944	74.1	8.7
	Heart Diseases (410, 443)	854	67.0	7.9
CUBA	All causes	42,244	621.5	100
	Heart Diseases (410, 447)	6,987	103.8	16.5
	Malignant neoplasms (140, 205)	6,526	96.0	15.4
	Vascular lesions affecting central nervous system (330, 334)	3,478	51.2	8.2

COUNTRY	CAUSES OF DEATH	NUMBER	RATE	% OF THE TOTAL NUMBER OF DEATHS
GUATEMALA	Accidents, poisoning and violence (E 880, E 999)	3,002	44.2	7.1
	Gastritis, duodenitis, etc. (543, 571, 572)	2,905	42.7	6.9
	All causes	69,287	1724.8	100
	Influenza and Pneumonia	11,491	286.1	16.6
	Gastritis, duodenitis, etc. (543, 571, 572)	8,976	223.5	13.0
	Birth Injuries (760, 776)	7,487	186.4	10.8
	Malaria (110, 117)	4,344	108.1	6.3
HONDURAS	Whooping Cough (056)	3,675	91.5	5.3
	All causes	18,650	956.4	100
	Influenza and Pneumonia (480, 483, 490, 493)	1,337	68.6	7.2
	Accidents, poisoning and violence (N 800, N 999)	1,235	63.3	6.6
	Birth Injuries, etc. (760, 776)	845	13.3	4.5
	Gastritis, duodenitis, etc. (543, 571, 572)	826	42.4	4.4
	Heart Diseases, etc. (410, 443)	522	26.8	2.8
JAMAICA	All causes	14,193	368.6	100
	Heart Diseases, etc. (410, 443)	1,468	89.8	10.3
	Vascular lesions affecting central nervous system (330, 334)	1,200	73.4	8.5
	Gastritis, duodenitis, etc. (543, 571, 572)	1,195	73.1	8.4
	Malignant neoplasms (140, 205)	1,165	71.3	8.2
	Birth Injuries, etc. (760, 776)	1,056	64.6	7.4
MEXICO	All causes	388,857	1077.4	100
	Gastritis, duodenitis, etc. (543, 571, 572)	54,857	152.0	14.1
	Influenza and Pneumonia (480, 483, 490, 493)	52,985	146.8	13.6
	Birth Injuries, etc. (760, 776)	46,847	129.8	12.0
	Heart Diseases, etc. (410, 445)	23,960	66.3	6.2
	Accidents, poisoning and violence (E 800, E 962)	14,730	40.8	3.8
Yucatán	All causes	7,413	1207.2	100
	Gastritis, duodenitis, etc. (543, 571, 572)	1,433	233.9	19.3
	Senility (780, 795)	1,136	185.3	15.3
	Birth Injuries, etc. (760, 776)	930	151.4	12.5
	Influenza and Pneumonia (480, 483, 490, 493)	358	58.5	4.8
	Bronchitis (500, 502)	348	56.7	4.7
Quintana Roo	All causes	278	554.1	100
	Gastritis, duodenitis, etc. (543, 571, 572)	47	93.7	16.9
	Senility (780, 795)	46	91.7	16.5
	Birth Injuries, etc. (773)	25	49.8	9.0
	Heart Diseases, etc. (430, 434)	13	25.9	4.7
	Malignant neoplasms (140, 205)	11	21.9	3.9

COUNTRY	CAUSES OF DEATH	NUMBER	RATE	% OF THE TOTAL NUMBER OF DEATHS
NICARAGUA	All causes	10,729	679.9	100
	Gastritis, duodenitis, etc. (543, 571, 572)	1,163	73.3	10.8
	Birth Injuries, etc. (760, 776)	1,093	69.3	10.2
	Accidents, poisoning and violence (E 800, E 962)	522	33.1	4.9
	Influenza and Pneumonia (480, 483, 490, 493)	475	30.1	4.4
	Malaria (110, 117)	451	28.6	4.2
PANAMA	All causes	8,054	702.8	100
	Heart Diseases, etc. (410, 447)	678	59.1	8.4
	Malignant neoplasms (140, 205)	559	48.8	6.9
	Birth Injuries, etc. (760, 776)	558	48.7	6.9
	Gastritis, duodenitis, etc. (543, 571, 572)	512	44.7	6.4
	Vascular lesions affecting central nervous system (330, 334)	467	40.8	5.8
DOMINICAN REPUBLIC	All causes	26,018	836.6	100
	Gastritis, duodenitis, etc. (543, 571, 572)	4,107	132.1	15.8
	Birth Injuries, etc. (760, 776)	1,974	63.5	7.6
	Malignant neoplasms (140, 205)	660	21.2	2.5
	Heart Diseases, etc. (410, 443)	626	20.1	2.4
	Influenza and Pneumonia (480, 483, 490, 493)	620	19.9	2.4
TRINIDAD & TOBAGO	All causes	6,465	723.2	100
	Heart Diseases, etc. (410, 443)	1,209	135.2	18.7
	Birth Injuries, etc. (760, 776)	794	88.8	12.3
	Vascular lesions affecting central nervous system (330, 334)	773	86.5	12.0
	Malignant neoplasms (140, 205)	573	64.1	8.9
	Influenza and Pneumonia (480, 482, 490, 493)	392	43.8	6.1
VENEZUELA	All causes	54,938	697.3	100
	Birth Injuries, etc. (760, 776)	5,179	65.8	9.4
	Heart Diseases, etc. (410, 443)	5,148	65.4	9.4
	Malignant neoplasms (140, 205)	4,242	53.9	7.7
	Gastritis, duodenitis, etc. (543, 571, 572)	3,783	48.1	6.9
	Accidents, poisoning and violence (E 800, E 962)	3,388	43.0	6.2

Gastritis, duodenitis, etc. (543, 571, 572) are still the most important causes of death in this area—53 per cent. Heart Diseases (410, 443) as a cause of death are prevalent in the developed countries. In 30.7 per cent of the countries of this area, heart diseases are the main cause of death. It is said, with exception of Cuba, that heart diseases are prevalent in the non-Latin American countries.

NUMBER OF DEATHS AND RATE PER 1,000 POPULATION IN THE
CARIBBEAN, 1962

COUNTRY	NUMBER	RATE
Colombia	177,208	12.0
Costa Rica	10,861	8.5
Cuba	49,173	7.0
Guatemala	69,287	17.2
Haiti		
Honduras	18,650	9.6
Jamaica	14,844	9.0
Nicaragua	10,729	6.8
Panama	8,054	7.0
Dominican Republic		8.4 (1961)
Trinidad and Tobago	6,465	7.2
Venezuela	54,938	7.0
Antigua	405	7.0
Netherland Antilles	896 (1961)	4.6 (1961)
Barbados	2,116	9.1
British Honduras	853	8.9
Bermuda	368	8.0
Dominica	658	10.8
Grenada	840	9.2
Guadeloupe	2,392	8.3
Bahama Islands	1,024 (1961)	9.5 (1961)
Cayman Islands	51	6.4
Turks and Caicos Islands	72	12.0
Virgin Islands (U.S.A.)	321	9.2
Virgin Islands (U.K.)	70	9.9
Martinique	2,179	7.3
Montserrat	128	9.8
Puerto Rico	16,548	6.7
St. Kitts, Nevis and Anguilla	587	9.8
St. Vincent	1,024	12.5
St. Lucia	1,186	13.0
Canal Zone	126	2.8
Mexico	402,488	10.8
Yucatán	7,413	12.0 (1960)
Quintana Roo	278	

NUMBER AND TYPE OF HOSPITAL IN THE CARIBBEAN
1962

COUNTRY	TOTAL	GENERAL HOSPITAL	MATERNITY	PEDIATRICS	OTHERS*
Colombia	560	458	32	20	50
Costa Rica	44	37	2	..	5
Cuba	175	107	7	6	55
Guatemala	45	30	1	5	9
Haiti	31	21	1	..	9
Honduras	30	27	..	..	3
Jamaica	28	22	1	..	5
Nicaragua	29	26	..	..	3

COUNTRY	TOTAL	GENERAL HOSPITAL	MATERNITY	PEDIATRICS	OTHERS*
Panama	27	24	..	1	2
Dominican Republic	79	62	10	2	5
Trinidad and Tobago	27	24	..	..	3
Venezuela	315	265	10	7	33
Antigua	3	1	..	..	2
Netherland Antilles	7	4	..	..	3
Barbados	10	1	2	..	7
British Honduras	9	6	..	..	3
Bermuda	2	1	..	..	1
Dominica	6	4	..	..	2
Grenada	7	3	..	..	4
Bahama Islands	2	1	..	..	1
Cayman Islands	1	1	..	..	..
Turks and Caicos Islands	1	1	..	..	..
Virgin Islands (U.S.A.)	3	3	..	..	..
Virgin Islands (U.K.)	1	1	..	..	..
Martinique	17	9	6	..	2
Montserrat	1	1	..	..	..
Puerto Rico	141	124	..	..	17
St. Kitts, Nevis and Anguilla	4	4	..	..	..
St. Vincent	6	1	1	..	4
St. Lucia	3	1	..	..	2
Canal Zone	4	2	..	..	2
Yucatán (Mexico)	92	78	10	..	4
Quintana Roo (Mexico)	17	17	..	..	..

*Hospitals for T.B., mental diseases, leprosy, and others not classified.

For a population of 58,391,613, there are 1,727 hospitals of which 79.1 per cent are general hospitals, 4.8 per cent maternity hospitals, 2.4 per cent pediatric hospitals, and 13.7 per cent are mental, T.B., leprosy hospitals, and others not classified. General hospitals prevail. Unfortunately they are not adequately distributed and they are not coordinated with smaller hospitals.

NUMBER OF BEDS AND TYPE OF HOSPITAL. RATE PER 1,000
POPULATION. CARIBBEAN, 1962

COUNTRY	TOTAL	RATE	GENERAL	MATERNITY	PEDIATRICS	OTHERS*
Colombia	45,726	3.2	31,012	1,067	1,862	11,785
Costa Rica	6,016	4.7	4,000	123	....	1,893
Cuba	41,898	2.3	11,757	1,811	1,753	26,577
Guatemala	10,250	2.6	7,627	11	481	2,131
Haiti	2,316	0.6	1,899	86	....	331
Honduras	3,579	1.8	2,849	....	....	730
Jamaica	6,825	4.2	2,843	164	....	3,818
Nicaragua	3,328	2.3	2,660	....	....	668
Panama	4,461	3.9	2,236	....	131	2,094
Dominican Republic	13,825	4.1	10,612	446	550	2,217

COUNTRY	TOTAL	RATE	GENERAL	MATERNITY	PEDIATRICS	OTHERS*
Trinidad and Tobago	4,712	5.3	2,692	....	....	2,020
Venezuela	27,463	3.5	17,427	874	800	8,362
Antigua	420	7.2	180	....	....	240
Netherland Antilles	1,410	7.4	920	....	....	490
Barbados	1,559	6.7	453	40	....	1,066
British Honduras	462	4.8	272	....	....	190
Bermuda	313	7.0	132	....	....	181
Dominica	274	4.6	222	....	....	52
Grenada	697	7.7	280	....	....	417
Guadeloupe	2,302	8.5	1,683	138	37	444
Bahama Islands	747	6.7	447	....	....	300
Cayman Islands	28	3.5	28	....	....	....
Turks and Caicos Islands	16	2.7	16	....	....	....
Virgin Islands (U.S.A.)	191	5.5	191	....	....	....
Virgin Islands (U.K.)	34	4.3	34	....	....	....
Martinique	3,703	12.5	2,765	121	....	817
Montserrat	69	5.3	69	....	....	....
Puerto Rico	12,289	5.0	7,239	....	....	5,050
St. Kitts, Nevis and Anguilla	205	3.4	205	....	....	....
St. Vincent	435	5.7	134	16	....	285
St. Lucia	410	4.6	240	....	....	170
Canal Zone	998	22.2	616	....	....	382
Yucatán (Mexico)	1,728	2.7	1,349	94	....	285
Quintana Roo (Mexico)	126	2.0	126	....	....	....

*Hospitals for T.B., mental diseases, leprosy, and others not classified.

For a population of 58,391,613 there are 198,815 hospital beds with a rate of 2.9 beds per 1,000 population.

The Latin American countries have a population of 48,766,101 or 83.5 per cent of the total population. They have 173,005 hospital beds with a rate of 2.8 beds per 1,000 population. On the other hand, the non-Latin American countries have 25,810 hospital beds for a population of 9,625,512 with a rate of 3.7 beds per 1,000 population.

Haiti has the lowest rate of beds in the Caribbean area, 0.6 bed, and the Canal Zone has the highest rate, 22.2 beds per 1,000 population.

NUMBER OF PHYSICIANS, SCHOOLS OF MEDICINE, GRADUATES, AND
RATE OF PHYSICIANS PER 10,000 POPULATION IN
THE CARIBBEAN, 1962

COUNTRY	PHYSICIANS		SCHOOLS OF MEDICINE	
	NUMBER	RATE	NUMBER	GRADUATES
Mesoamerica	26,268	4.5	98	7,940
Colombia*	7,453	5.0	7	442
Costa Rica	575	3.5	1	....
Cuba	5,841	8.3	2	355

COUNTRY	PHYSICIANS		SCHOOLS OF MEDICINE	
	NUMBER	RATE	NUMBER	GRADUATES
Guatemala*	954	2.4	1	35
Haiti	400	0.9	1	41
Honduras	365	2.2	1	34
Jamaica	655	4.0	1	25
Nicaragua	524	3.5	1	22
Panama	502	4.4	1	14
Dominican Republic	442	1.5	1	85
Trinidad and Tobago	350	3.9	..	....
Venezuela	5,766	7.3	6	258
Antigua	17	2.9	..	....
Netherland Antilles	137	7.2	..	....
Barbados	82	3.5	..	....
British Honduras	20	2.1	..	....
Bermuda	37	8.4	..	....
Dominica	8	1.3	..	....
Grenada	20	2.2	..	....
Guadeloupe	122	4.2	..	....
Bahama Islands	65	5.9	..	....
Turks and Caicos Islands	2	3.3	..	....
Virgin Islands (U.S.A.)	24	7.3	..	....
Virgin Islands (U.K.)	2	2.5	..	....
Martinique	122	4.1	..	....
Montserrat	3	2.3	..	....
Puerto Rico	1,121	7.0	1	45
St. Kitts, Nevis and Anguilla	12	2.0	..	....
St. Vincent	10	1.2	..	....
St. Lucia	10	1.1	..	....
Canal Zone	103	22.9	..	....
Yucatán (Mexico)	518	0.8	1	....
Quintana Roo (Mexico)	6	0.9	..	....

*Refers to the total number in the whole country.

NUMBER OF NURSES AND AID NURSES AND RATE PER 10,000
POPULATION IN THE CARIBBEAN, 1962

COUNTRY	NUMBER		NUMBER PER 10,000 POP.	
	NURSES	AID NURSES	NURSES	AID NURSES
Mesoamerica	32,962	41,483	5.6	7.1
Colombia*	900	3,084	0.6	2.1
Costa Rica	411	1,233	3.2	9.7
Cuba	5,701	2,003	8.1	2.8
Guatemala*	466	1,672	1.2	4.2
Haiti	357	561	0.8	1.3
Honduras	161	982	0.8	4.9
Jamaica	3,424	....	21.0	....
Nicaragua	263	868	1.7	5.5
Panama	723	1,144	6.3	10.0
Dominican Republic	207	1,171	0.6	3.6

COUNTRY	NUMBER		NUMBER PER 10,000 POP.	
	NURSES	AID NURSES	NURSES	AID NURSES
Trinidad and Tobago	1,254	....	14.9	....
Venezuela*	2,868	10,512	3.6	13.4
Antigua	106	....	18.3	....
Barbados	248	355	10.7	15.3
British Honduras	165	....	17.2	....
Bermuda	63	15	15.0	3.6
Dominica	55	....	9.0	....
Grenada	114	24	12.5	2.6
Guadeloupe	215	....	7.4	....
Bahama Islands	248	102	22.3	9.2
Turks and Caicos Islands	7	3	11.7	5.0
Virgin Islands (U.S.A.)	19	....	5.9	....
Virgin Islands (U.K.)	6	9	7.5	11.2
Martinique	245	218	8.2	7.3
Montserrat	26	....	20.0	....
Puerto Rico	3,212	4,787	13.1	19.5
St. Kitts, Nevis and Anguilla	132	56	22.0	9.3
St. Vincent	74	32	9.7	4.2
St. Lucia	84	5	9.1	0.5
Canal Zone	208	343	46.2	76.2
Mexico*	11,000	12,304	1.6	3.3

*Refers to the total number in the whole country.

SUMMARY PHYSICIANS IN THE CARIBBEAN AREA

AREA	POPULATION	PHYSICIANS		INHABITANTS PER PHYSICIAN
		NUMBER	RATE PER 10,000 POPULATION	
Latin American Countries	48,966,161	24,467	5.0	1,993
Non-Latin American Countries	9,425,452	1,810	1.9	5,344
Total	58,391,613	26,268	4.5	2,223

SUMMARY NURSES AND AID NURSES IN THE CARIBBEAN AREA

AREA	NURSES		AID NURSES		TOTAL	
	NUMBER	%	NUMBER	%	NUMBER	%
Latin American Countries	26,269	79.7	40,321	90.6	66,590	89.4
Non-Latin American Countries	6,693	20.3	1,162	9.4	7,855	10.6
Total	32,962	44.3	41,483	55.7	74,445	100.0

RATES PER 10,000 POPULATION IN THE CARIBBEAN

AREA	TOTAL	NURSES	AID NURSES
Latin American Countries	13.6	5.3	8.3
Non-Latin American Countries	8.2	7.0	1.2
Total	12.7	5.6	7.1

NUMBER OF NURSES PER PHYSICIAN IN THE CARIBBEAN

AREA	NURSES AND AID NURSES	NURSES	AID NURSES
Latin American Countries	2.7	1.1	1.6
Non-Latin American Countries	4.4	3.7	0.6
Total	2.8	1.2	1.6

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Robert L. King: HEALTH FACILITIES CONSTRUCTION
IN THE CARIBBEAN

I

IT IS SAID that the solution of every problem is basic in the problem itself. Therefore, "Understand fully the nature of the problem and the solution is much nearer." This is a basic principle in the "planning process," and especially so with regard to proper planning, design, and construction of health facilities. It is even more important in the Caribbean Area and in Latin America, where the conditions are often so different in cultural, ethnic, and religious backgrounds, and so extreme in economic position and potential.

After many years in the Latin American area as an architect, engineer, and planning consultant I like to think that close adherence to this analytical planning process has been a primary guideline for me in the planning, design, and construction of a variety of health projects—from small rural health centers and clinics to large medical schools and teaching hospitals.

The conditions have been different. The problems have been different, often even within the same country. The solutions, too, have been different. However, the basic objectives have always been the same.

1. To foster the broadened concept of the place of hospitals and health facilities in the community and the nation;
2. To recognize the individual problem of each project;
3. To help translate the social or public part of the situation, as well as the health problem, into practical, effective, economical, and pleasing results; and
4. To develop each project in accordance with the national resources, and at the same time to set up standards for the country.

James Russell Lowell, in his discourse "The Present Crisis," said: "New occasions teach new duties." Indeed, different situations have taught us the obligation of new solutions.

In this paper I have broadened the range of my originally assigned subject to include "Planning and Design" as well as "Construction of Health Facilities." This range is broad and inclusive, as it should be, and I hope that it indicates the desirability of interrelating these particular aspects of a whole health construction program as well as those of any specific health construction project.

From this widened spectrum, "Planning, Design, and Construction," let us think together about some of the broad, general problems as they relate to local conditions, then focus on some of the more common problems, and perhaps even indicate some answers for the Caribbean, although so many different regions and conditions are represented.

II

My approach will be that of a consultant in providing the catalytic action necessary for "team" decisions. I do not offer any rigid answers to your construction problems but hope that I can provide you with an appropriate background of basic information, principles, and criteria for the construction of health facilities.

To further variegate this spectrum my remarks will include still another dimension since they may have reference to the large number of small rural health projects or to the smaller number of more sophisticated hospitals and medical schools in highly urban areas. Adobe blocks, septic tanks, community participation, self-help techniques, and the like have little meaning in a complex social security or military hospital structure in a large capital city. Likewise, "high rise" reinforced concrete structures, high-speed elevators, steam sterilizers, and complicated mechanical equipment would seem absurd in an isolated village community. Indeed, the conditions, the problems, and the solutions may all be different. Yet they can be as complex or as simple as we want to make them.

No doubt my comments will be flavored by my interests in the problems at the grass roots level since my own experiences have often been in the less developed areas, and at even lesser developed times.

Although each health facilities project is an individual problem the general principles treated here may be of some help. In fact, much may apply to health problems in general as well as to health facilities specifically, thus there may be some repetition of remarks and discussion by

previous speakers. Indeed, as you will see, health facilities construction can benefit from all the disciplines represented at this Conference, and it may not be at all new to you.

At the Ministerial level, program and planning decisions may take months of discussion, debate, and delay, but once the decisions have been made, the design and construction aspects, if any, are expected to be accomplished in quick succession. Miracles must then be performed, both as to time and budget. A good design does take time.

Design of hospitals and health facilities, especially, should not be an isolated interlude accompanied by soft music in the architect's office. It should be intimately linked to programming and over-all planning, and in more ways than just the selection of the building site and preparation of preliminary estimates and the original construction budget.

Program planning affects the design, and the design defines the construction. However, the planning process quite often works in some sort of reverse order. Construction possibilities, or limitations, can greatly affect and often even determine the design of a health facility. For example, local construction techniques, materials, manpower and building craftsmen, transportation, and others, can have considerable influence on the success or failure of a necessarily economical health facility.

III

At the 10th Assembly of the World Health Organization in Geneva in 1957 the subject for the technical discussions was "The Role of the Hospital in the Public Health Programme." There was relatively little discussion on the question of hospital construction, although it was generally agreed that design was a local problem depending on materials available and on the type of construction prevalent in the particular district.

Yet, even this is not so simple. Both the design and the construction of health facilities do sometimes present problems to the architect, the engineer, and the builder. Although these same problems often are of little importance to the Minister or Director General of Health, they can be of considerable consequence, not the least of these consequential problems being that of meeting the construction budget.

It is not difficult to conclude that thoughtful planning, design, and construction are all important, but not necessarily in that order. Neither functional and simple design nor solid, durable construction can guarantee the success of any health project. However, the physical plant itself can be an aid or a deterrent in a well-conceived health program and I

might add that it is quite a challenge to turn a limited budget into an asset. Often a most happy result has been the unity, integration, and coordination of health services, made possible by the physical plant itself.

It is encouraging to note that increased awareness on the part of public officials and citizens alike has produced a greater recognition and demand for effective planning and design, as well as economical yet durable construction. Fortunately, too, there is an increasing community desire that the hospital should be one of the best and most handsome buildings in the community.

When the construction problems are more fully understood, the design solution may even become obvious. Likewise, when the cultural, economic, and social problems are more fully understood, decisions as to design and construction should become easier. And, when the total health program or project activities are clearly established, and shared with the design and construction members of the planning team, the desired results can be more readily attained. Therefore, one of the finest compliments to a hospital planning team would be to recognize the simplicity of a specific solution. For the difficult would seem easy, rather than the reverse where we tend to make the easy seem difficult.

IV

Obviously the design and materials of a small health center or clinic in the tropical heat of Bluefields, Nicaragua, should not be the same as those used in the cool mountains of Quezaltenango, Guatemala, or Bogotá, Colombia, or even the island tradewinds regions of Guadeloupe or San Andres and Providencia. Both climate and geography exert their influence. Both climate and geography must be dealt with. Both climate and geography can be used to advantage.

Nature should be used intelligently, and climate, especially in the Caribbean, should assume its proper position as one of our natural resources. The local climate can make much difference in location, site planning, open-ness of plan, selection of building materials, type of roof or kind of floor, use of natural or artificial ventilation and lighting, color selection, and much more.

The land is not always generous with appropriate building materials and possibilities, even in neighboring countries or adjacent islands. Some building materials may be plentiful and inexpensive, although not necessarily the most desirable for a hospital or health center. Or, critical materials, such as cement, may be in short supply and expensive, as well as acceptable substitutes.

Soil and subsoil conditions can provide a major expense as well as a hazard. Soil erosion can prove disastrous, especially with the usual deficient or nonexistent maintenance budget. It is most unfortunate when an abnormally high percentage of the construction budget must be buried with the building foundation due to poor soil and site conditions or site planning. Choose your site carefully, and remember that a free site is not always an economy.

Whether because of the local geography or economic conditions, land communications may be limited or lacking, tedious and slow, difficult and expensive. While transportation may not be a problem now in Puerto Rico, Jamaica, or even central Panama, it can be quite a problem and expense in some areas of Venezuela, Colombia, or the interior of the Central American republics. Many construction budgets have been exceeded due to expensive transport costs. Quite logically, then, transportation could have considerable influence on construction—and therefore building design—of health facilities even more so than housing, in almost any area.

V

Long ago those of us involved in various of the technical assistance programs in Latin America found that in order to do a truly effective job we cannot impose our ways on the people, but must understand them, their culture, and their problems. What to do is quite often a problem. No doubt we could all benefit considerably from one of the basic principles of first aid that I learned early in my Boy Scout days, and that consists in knowing “what *not* to do.”

In spite of all the thoughtful planning and design, modifications must often be made to meet local needs, and often these needs are related to cultural, ethnic, and even religious differences in a region. Such desirable changes in planning and design can often aid the success of a project.

Since Biblical times we have seen that cultural and religious birthmarks can also promote desirable health practices. Good nursing techniques, for example, can be encouraged by careful attention to these lesser known factors during the planning and design stages.

A notable advance has been made in the health field in the area of the basic social sciences, sociology, anthropology, psychology, economics, and political science. Applied social anthropology has been a tool in my planning kit for a long time, ever since I met Isabel Kelly, a Smithsonian Institution anthropologist, in Mexico more than twenty-five years ago. Knowledge and understanding of the people with whom we must

work has led to many successful health projects, even in the buildings themselves.

Anthropologists tell us that the prevailing ideas about illness and health are the result of many generations of a blend of primitive native beliefs and of medical heritage brought to the New World. A greater knowledge of the prevailing concepts and practices of folk medicine could contribute to the over-all effectiveness of a health program, and frequently this can be easily incorporated in the building itself. In a medical penetration project, for example, a health center for preventive medicine must often take the guise of a doctor's clinic or hospital, dispensing the magic of curative medicine, in order to assure initial success.

In the Caribbean area, even more so than in Latin America as a whole, there has been an amazing heterogeneous ethnic and cultural implant. In typical resistance to cultural change, each man clings to a good measure of his past and is reluctant to change. Voodooism and black magic cures prevail. Folk medicine practices related to birth and death are often the most difficult to handle in a hospital project. Delivery and nursery suites may have to be planned accordingly. Areas may increase and sterile or aseptic techniques may seem impossible. Feeding and visiting schedules hardly seem to exist. Also, a maternity or pediatrics hospital, or ward, should be designed with special regard for the traditional local practices of the mothers in the care of their new-born or sick children. The rooming-in technique is an old and established practice. Then, the morgue, or autopsy room, may or may not be used for the assigned purpose. In many areas the hospital serves the function of a funeral home as well. Prevailing religious practices, or laws, may be determining factors.

Whatever the health facility, it must attain certain social acceptance in the community. It is an encouraging sight to the medical team to sense and see a generous welcome when the mobile health unit or medical launch arrives at an isolated village. And, in so many ways, the health facility itself can help tremendously in an active program of health education.

By now I hope that you have begun to look differently at the problems of health facilities construction. It would not be much fun if just any building would do and all were alike. Perhaps you have begun to establish your own new criteria for all phases of the problem. A basic vocabulary must be included in any list of criteria when planning for health facilities construction: climate, local geography, building materials and techniques, manpower, transportation, cultural patterns, and economic and social conditions.

VI

As general and nonapplicable as some of these criteria might seem to you in a hospital construction program, there is another factor that is most real, and that is the ominous limiting detail of a fixed budget and the resultant importance of economy in all phases of a project.

Whether we like it or not, the improvement of building practices, and therefore health facilities construction, is a matter of compromise, especially in the low-income areas. Some of the factors in the compromise include building size, materials and finishes, design, services and facilities, permanency, expansion, comfort, and other amenities. Note that these compromise factors apply to housing as well. All, then, must eventually be equated with cost, since cost is often the major compromising factor. In fact, in the remote village areas it is impossible to meet the high cost of hospital construction and maintenance.

Economy of construction is imperative, and the utilization of community resources is essential, although not easy. A real problem is just how to lower costs without lowering standards, which are already pitifully low in many hospitals and health facilities, small and large. Costs are increasing for new construction and part of the increase is to meet increasing demands for health services. This should be a healthy sign.

Yet increased costs unfortunately often discourage the construction of new facilities, or often limit the project to only a portion of that needed and planned. In the latter case a carefully studied master plan is even more necessary in order to properly decide on the construction stages. All elements must be used to reduce costs, but with a minimum of sacrifice. This requires good planning, but it must start early. Yet remember, the two objectives of quality and economy are not, of necessity, inconsistent. Here I must emphasize the difference between economical construction and cheap construction. This is important in a small village project and also in a large urban project, although there may be less emphasis on economy in the latter.

I remember one of Dr. Ross Jenney's comments several years ago when he referred to a tendency "to plan for providing the needs from some enormous and mystical fountainhead of revenue." As yet I have not found that kind of client. Other needs always seem equally demanding.

Significant accomplishments are being made in the direction of economy in health construction, with a good part of the pioneering being done in the low-cost housing field. There are many welcome contributors: the simple increase in qualified construction laborers; better and less

costly building materials; improved building techniques, especially in plumbing, electrical, and other mechanical fields; national standards and building codes; and financing arrangements. There is even some welcome relief from high import duties through growing common market agreements.

Fortunately, with the more recent emphasis on the study and formulation of sound national health development plans, fostered by the World Health Organization and the Alliance for Progress, long-term financing is becoming more available from various international sources for the "bricks and mortar" programs of health facilities construction. This applies particularly to specific health projects, generally large, or to smaller ones forming part of a coordinated health system.

Acceptable and digestible financing arrangements are of vital importance, whether at the local, state, or national level. No doubt there is a competitive force at work here too—sometimes between communities, sometimes between countries, and sometimes even between political concepts.

Since it is almost always necessary to stretch the building funds as far as possible and practical, increasing success can be expected from the grant-in-aid system. Valuable community participation is then forthcoming, stimulating increased community interest and later financial responsibility. For the smaller, rural projects, self-help techniques may find some valuable application. Most generally, however, government participation is needed in some form or other.

Quite often when we speak of an economical health facility we refer only to the initial construction and equipment costs, with perhaps some reference to building maintenance through the use of more permanent materials and finishes. Careful selection and location of equipment can help produce beneficial reductions in cost by eliminating duplication.

However, good planning and design can often produce long-range and recurring economies in several forms. Construction is a "one shot" item. Maintenance is recurrent. Salaries, however, can be an ordeal every month, although they may constitute a lesser percentage of the operating budget in the Caribbean area than in North America.

Through the careful and thoughtful location and integration of related services and equipment, maximum use of facilities may be obtained with minimum personnel. Carefully considered circulation areas and reduced corridor lengths, both for patients and services, can permit and encourage a more efficient use of personnel time as well as a more effective control of people and things by emphasizing these important aspects of day and night operation. These are economies that prove themselves

every day by permitting decreased salary costs and minimizing waste and theft of time and supplies.

Yet, it is not uncommon to see the reverse with willful disregard for these elements of good planning so as to justify and support the need for hiring more personnel, especially in the kitchen and household areas of a hospital and thus provide still another "meal ticket" to the side door of the kitchen. This type of misuse, or abuse, seems to come easy in public institutions, and it is not limited only to the Caribbean or Latin America.

VII

Almost any inspection and inventory of existing health facilities in most countries in the Caribbean will probably show that few buildings have been designed specifically for health services, many having been adapted to partially meet the function. Possibly 50 per cent will be in fair repair, and the rest will be deplorable. No doubt even a higher percentage will have mechanical malfunctions and precious mechanical equipment and instruments out of order.

Poor design and construction can take an early toll, but most of the deterioration can be attributed to poor or inadequate maintenance, largely due to the lack of maintenance budgets as well as of trained repairmen. A program of preventive maintenance is a rarity. It is perhaps even more rare to find a health budget that has included an item for equipment depreciation and replacement.

Since funds are rarely available for large-scale construction of new health facilities a planned improvement program of repair, remodeling, and expansion may provide a welcome and even broader answer to immediate needs.

Unlike the field of low-cost housing there is not a wealth of applicable specific reference material available in the field of health facilities planning, design, and construction. Fortunately, however, much of the reference material related to housing construction, and more especially low-cost housing, throughout the world has considerable application to the construction of health facilities in the Caribbean. Basic principles and criteria, such as those mentioned earlier, are essentially the same.

The United States Public Health Service, Hospital Facilities Division, has produced, since 1946, a steady stream of guides and minimum standards for all sorts of health facilities, but with special application to the needs in the United States under the Hill-Burton Hospital Construction Program. True, these standards have been translated and copied, varied

and again repeated around the world, sometimes successfully, but most often without proper regard for the local situation. Unfortunately, a great number of these standardized plans were planted as models in many areas of the world, as well as in the United States in the early days of the hospital boom.

Needless to say, conditions in Latin America, and especially the Caribbean, can be quite different, necessitating different program requirements and planning techniques. Existing acceptable hospital and health facilities are often quite limited; needed equipment is lacking; and necessary medical and paramedical personnel are in critically short supply. Successful health education programs and national economic growth have created new demands for all sorts of health services.

VIII

Since health care in the Caribbean finds itself at a different stage in development there is still great emphasis on health education and the public health approach through preventive medicine and the out-patient clinic as part of the hospital. Many hospitals actually are not much more than convalescent care and custodial care centers, with facilities and services at a very bare minimum. Thus, the concept of progressive health care should be particularly applicable.

In some areas a most successful solution to many of these problems and needs has been the development of a rather unique integrated and coordinated health facilities system, often on a regional basis. Emphasis is usually placed on administratively and physically connecting the public health or preventive medicine aspects of a health facility to the hospital and the out-patient department. Diagnostic and treatment facilities, equipment, and personnel have thus effectively and economically served all areas. Administration and supervision can be greatly simplified, and training and teaching, however modest, can become a part of the facility.

In the regional or satellite hospital system, the larger hospital is considered the Central Hospital, and often is affiliated with a teaching institution, devoting considerable time and effort to this activity. The Intermediate Hospitals are then located in larger centers of regional population, and the Local Community Hospitals are of a more general character. Then the Rural Health and Hospital Centers are located in the more isolated areas. The object of this regional system is not to exercise complete control from the larger hospital, but to coordinate all the services.

Social security systems, both for the laborer and the white-collar employee, have included or increased health services and facilities. Some of these are the finest in the hemisphere, largely due to the ample and sometimes excessive budgets. The larger military hospitals tend to fall into this same category. These two hospital and health systems—social security and military—generally are outside the control of national agencies providing centralized control or coordination of health services.

Now, the problem is not only what to do, but how to do it? Much can be learned from technical assistance and other international activities, whether from bilateral or multilateral programs. Very little has been published on the actual health facilities in this area, and there is always a need for the exchange of comparative information. After the first five years of a hospital and health facilities construction program in Latin America by the Institute of Inter-American Affairs, through the various National Cooperative Health "Servicios," a small volume on both large and small health facilities projects was published in 1948. It served a valuable comparative purpose in the early days of the program. The architects pointed out that, in general, North American standards in hospital and health facilities planning had been followed, but the plans had been adapted to climate, local health and social problems, customs and opinions, local materials, and labor skills. Similar planning and construction activities have continued since, and even before, through various of the colonial offices in the Caribbean.

In the early days of the Cooperative Health Program in the various Latin American countries the technical assistance in planning provided by North American specialists was gradually diminished as local architects and engineers were trained, gaining valuable experience in this specialized field.

The need for specialized and consultative services should be emphasized, however, and these services should be available early in the planning before working drawings are commenced. The WHO has stated that "technical experts seem necessary, and a team in the Ministry of Health, a functional group of doctors, architects and engineers, should study every scheme put forward."

IX

During the over-all planning, design, and construction phases of a health facilities project, the following five basic planning steps should be dealt with, and preferably in this order:

1. *Study and Analysis of Needs.*—A preliminary study or survey may be necessary to help determine the feasibility of the project.

2. *Program Requirements*.—Included here is an actual determination of building needs, in program form, for all the departments, services, areas, equipment, and even personnel.

3. *Planning Criteria*.—Climate, geography, cultural, ethnic, and religious background, and social and economic conditions will help define the broad aspects of the plan, design, and construction.

4. *Design Standards*.—Desired standards will be determined as to necessary facilities and services, minimum areas, building standards and codes, mechanical installations, safety and sanitation.

5. *Construction Manual*.—Although this phase would normally include the working drawings and specifications, it may include minimum requirements for building techniques and instructions, presented in graphic sketch form to aid the construction in rural village areas, under a system of aided self-help.

The Principle Elements in the planning, design, and construction of a hospital or other health facility would include the following:

The site, the site plan and site improvements, building type, building plan, structural system and materials of construction, mechanical system, and material finishes, details and equipment.

Amplification of these Principle Elements shows that they are essentially no different from those for good construction anywhere, especially housing, except that the special nature of the health project must be kept in mind.

1. *The Site*.—Location in the community is important since the health facility should be able to serve the maximum number of people. The land area should be sufficient to comfortably accommodate the facilities and provide the services contemplated, and with adequate provisions for expansion. Soil and subsoil conditions should be acceptable.

2. *The Site Plan and Site Improvements*.—Land use should be in accordance with accepted good practice, where zoning is not in force. This includes proper consideration of auto and pedestrian approaches. Public and service entrances should be carefully located, as well as off-street parking, where needed. Land-use should be considered, leaving ample area for landscape development. Generally multistory buildings are a logical product of limited available land, plus extensive program demands and expansion needs. Noise and safety must also be considered, especially with regard to hospital projects. However, probably the two most important items in both site selection and site development are the most difficult: available safe water supply, in sufficient quantity, and safe sewage disposal, free from contamination.

3. *Building Type*.—Budget limitations, availability of building materials, and prevalent construction techniques will determine the type of

building, whether one-story or multistory; masonry or other, or even prefabricated.

4. *Building Plan.*—The physical layout of the hospital or health building must permit the accomplishment of the prescribed health tasks without undue stress and fatigue on the staff or patients. Circulation patterns should be carefully planned, and the plan layout should be simple, functional, and flexible, and should relate to the site and the climate as well. Both natural and artificial illumination must be considered, with proper regard for necessary ventilation. Drawings and specifications should be provided to the extent needed.

5. *Structural System and Materials of Construction.*—Although there are few public health principles involved in the construction of health facilities, several important items must be considered. Strength must be emphasized in order to resist high winds, earthquakes, water, and structural decay. Protection from the weather is important, and more especially in climates of extreme conditions. Excessive dampness, whether considered from the standpoint of folk medicine or not, can be a definite hazard. Durable building materials and sound construction techniques should be used to avoid undue hazards to occupants. X-ray protection must be considered. Maintenance problems should be minimized. The selection of a suitable structural roofing system and roofing materials will probably be one of the most difficult and most important decisions in village projects. A solid, smooth, and easily cleaned floor is an essential element; the traditional cement tile has provided excellent results in tropical areas. Prevention of structural deterioration is important, and here again dampness is the culprit. Safety against fire must be a prime consideration, more especially in a hospital. Fire hazards should be avoided or removed, and fire progress retarded through the use of less hazardous materials. Adequate means of exit from the building must be provided.

6. *Mechanical System.*—Necessary equipment should be provided for, and should be operable and safe. A safe, potable water supply should be available, if at all possible, and under pressure. Sewage disposal also should be safe and adequate. Further mechanical installations may be called for, such as high pressure boilers, steam lines, air-conditioning units, and a limited heating system. Use of oxygen and explosive gases should be carefully considered.

7. *Material Finishes, Details, and Equipment.*—Safety and sanitation should be prime considerations in the selection of material finishes, especially floors, walls, and ceilings, as well as cabinets, furniture, and equipment details. Adequate protection against vermin must be considered so as to control health hazards, such as flies, mosquitoes, and rodents. Proper handling and disposal of refuse is essential.

X

And now, a random summary or recapitulation of some general recommendations for the planning, design, and construction of health facilities, but not necessarily in this, or any, order.

Start early. Form a competent planning team and determine the need for consultant services.

Design, planning, and construction should not be isolated from the realities of social, economic, and cultural features which characterize the community.

Adapt to local climate, health and social problems, customs and opinions, building materials and labor skills.

Preconceived and rigid decisions as to precise details of a project are almost certain to inhibit a balanced, well-rounded, economical plan.

Stress simplified control of circulation of patients, staff, and equipment.

Design and construction possibilities must be related to available resources.

Relate to the over-all national health development plan.

Stress functional, flexible, and simple plan and design.

Avoid luxuries and refinements, until later.

Learn from the housing industry, as regards building materials, techniques, etc.

Place the proper emphasis on quality, permanence, stability, safety, and sanitation.

Have a proper regard for maintenance and replacement requirements.

Simplify, where possible, all mechanical installations.

Evaluate as to quality, costs, adequacy, and other factors on the basis of experience, if there has been enough.

Adjust to the lack of economic resources and technical means in the less developed areas.

Relate to budget. Emphasize economical yet durable construction.

Look for ways to broaden the base of financial support.

Provide for the most effective and efficient use of personnel and equipment.

Relate to available medical and paramedical personnel.

Look for health education possibilities. Provide for training and teaching situations.

As for the future, the out-patient will remain ambulatory and the hospital patient will remain prone.

In general, plan to separate patient areas from diagnostic and treatment facilities, as well as services, such as kitchen and laundry. The real changes will be in these areas with new and wonderful diagnostic

and treatment techniques, equipment and facilities, as well as kitchen, service, records, and electronic devices.

Like all else, the hospital and health situation is never static, and "New occasions teach new duties," indeed. Hospitals and health facilities must reflect the rapidly changing situation.

Some years ago I took the time to read the report of the Kellogg Foundation after its first twenty-five years as a guiding force in the health field in this continent. E. C. Morris, President of the Kellogg Foundation, in commenting on the need for wise stewardship by the Foundation, said, "Remain alert to changes in needs and problems of society and have the flexibility to change with the changing times." And, he continued, "the wisest stewardship is to help people help themselves."

**Harold W. Brown: GOVERNMENT AND MEDICINE IN THE
CARIBBEAN**

THE CARIBBEAN AREA with its islands of many sizes and the Central and South America littoral with divergent populations present a great diversity of medical problems. All these countries, however, have in common a number of important characteristics.

1. A large portion of their population is medically indigent.
2. Government has assumed responsibility for health care of the masses.
3. Physicians, hospitals, and other health care services are often concentrated in the large cities.
4. Populations of considerable size living in villages and rural areas have grossly inadequate health care.
5. The public in general is demanding that more and better health care be provided by the government.
6. Facilities for educating and training physicians, dentists, nurses, technicians, and other members of the health team are inadequate.
7. Government in view of priorities of education, agriculture, and industry finds it difficult or impossible to finance adequate preventive medicine, hospitalization, medical care, and education of health workers.

My discussion will be limited to the islands of the Caribbean area, for because of their small population, area, and limited natural resources they vividly illustrate the problems faced by government in medical care.

I

Governments throughout the world have now committed themselves to a guarantee of providing at least a minimum health care and welfare for their citizens. In countries with free economies this is done through both

private and public facilities. Gradually the economic barriers to adequate health care and welfare are being overcome through government aid and insurance, either voluntary or compulsory. The latter is politically of considerable significance. In socialist and communist-dominated countries the provision of health care for the public is completely controlled by government.

Unfortunately, developing countries with the lowest per capita income often experience the highest morbidity and mortality rates. Many of the illnesses, although not necessarily fatal, could be ameliorated by adequate medical and hospital care. Many of the deaths of not only infancy and childhood but also of adults, especially those due to communicable diseases, could be prevented. A safe water supply, insect control, and immunization have reduced diseases spread by these modes of transmission. A well-organized public health program could prevent much of this illness.

In the Caribbean area as many as 60 to 90 per cent of the population may be medically indigent, with per capita incomes of one-fifth to one-twentieth those of the United States. It is obvious that an income of \$100 to \$500 per year leaves little to purchase a minimum of health care, and the financing of even a short illness is impossible. A major illness is a financial disaster. In one study in this area it was found that one or more members of 46 per cent of the families suffered from long-term illness. Hence government assumes an extensive role and great responsibility for medical care in the Caribbean islands.

When one examines the crude death rate which represents the number of deaths from all causes per 1,000 population, most of the Caribbean islands appear to be healthful places, for the rates of many are below that of the United States. Thus Puerto Rico's crude death rate of 6.7 per 1,000 is considerably lower than the 9.1 rate of the United States (Table 1). Part of this difference in crude death rates is due to the difference in the age composition of the two populations. In Puerto Rico only 18 per cent of the population is 45 years of age or older whereas in the United States 29 per cent of the population is over this age. Thus the populations on the Caribbean islands are relatively young, falling in the age groups in which the death rate is relatively low. St. Vincent with a crude death rate of 12.5 per 1,000 has only 16 per cent of its population in the 45 year and older age group, which indicates a relatively high death rate for the lower age group. This is borne out by the high infant mortality rate; the number of deaths among children under one year per 1,000 live births being 106 compared to 25 for the United States. The infant mortality rate is one of

TABLE 1

ANNUAL CRUDE DEATH RATE, INFANT MORTALITY, AND
POPULATION INCREASE OF THE CARIBBEAN ISLANDS

	DEATH RATE PER 1,000 POPULATION	INFANT MORTALITY PER 1,000 POPULATION	POPULATION INCREASE PER 1,000 POPULATION
Antigua	7.0	42	19
Bahama	9.5	48	33
Barbados	9.1	55	13
Cuba	7.0		21
Dominican Republic	8.4	102	35
Dominica	10.8	74	17
Grenada	9.2	52	15
Guadeloupe	8.3	33	29
Haiti			30
Jamaica	9.0	48	13
Martinique	7.3	41	28
Netherlands Antilles	4.6	19	31
Puerto Rico	6.7	40	6
St. Kitts, Nevis, Anguilla	9.8	61	15
St. Lucia	13.0	96	15
St. Vincent	12.5	106	19
Trinidad and Tobago	7.2	38	29
Virgin Islands (U.S.)	9.2	28	19
United States	9.1	25	16

the best indicators of the health of a country. Table 1 shows that the Caribbean islands in general have infants dying at rates up to four times that of the United States. This high infant mortality then is a major health problem of the islands.

In the United States approximately 81 per cent of all deaths are among the group over 50 years of age and only 7 per cent among the group under 5 years of age. By contrast, approximately 58 per cent of the deaths in the Dominican Republic are in the age group under 5 years and only 23 per cent in the age group over 50 years (Table 2). It is obvious that the excessive mortality among the group under 5 years of age is a challenge to health workers.

The causes of death in the early age groups are more responsive to preventive measures and medical care than the causes of death in the older age groups. Most of the infectious diseases of the respiratory tract and gastrointestinal tract which account for high morbidity and mortality of children can be prevented by immunization and cured with drugs now available while the cardiovascular diseases and cancers of adults are often fatal, even in the face of the most up-to-date therapy. Hence there is every promise of reducing the high morbidity and mortal-

TABLE 2

PERCENTAGE OF DEATHS UNDER 5 YEARS OF AGE AND OVER 50 YEARS OF AGE

	UNDER 5 YEARS	OVER 50 YEARS
Dominican Republic	57.7	23.4
Jamaica	32.9	51.6
Trinidad and Tobago	23.8	57.5
United States	6.9	80.9

ity of the children of the Caribbean islands. If government in medicine is successful in reducing mortality, unless agricultural and industrial production is increased at the same time, the increasing population will automatically lead to a lower living standard.

The foregoing outline of some of the health problems of the Caribbean islands indicates that on a mortality basis the present concentration of the health program on the younger ages would be most rewarding. Likewise family planning and limitation are necessary to prevent overpopulation. Unfortunately reliable morbidity statistics are not available, but the tropical area has in addition to the bacterial and viral diseases all of the animal parasite infections.

In spite of high infant and childhood mortality rates, the population on a number of Caribbean islands is increasing at an excessive rate, a number of them at over 3 per cent per year (Table 1). Puerto Rico's population increase of only 0.6 per cent is usual and due partially to a moderate birth rate but also to the extensive population migration to the United States. Population migration to Great Britain from some of the islands will affect their population growth. One of the major problems facing the world is this so-called population explosion and resultant food shortage, and of course every successful effort to reduce infant, childhood, maternal, and middle age mortality compounds the population problem.

II

In view of the above it is of interest to look at the health facilities that are available on the several Caribbean islands to cope with their medical problems. The number of physicians per 10,000 population (Table 3), varies from 1.1 on St. Lucia to 8.3 on Cuba. The United States has 14.0 physicians per 10,000 population. From 32 per cent to 100 per cent of all the physicians on the Caribbean islands are employed by the government. Only 7 per cent of the physicians in the United States are in governmental service. In areas where there is a high de-

TABLE 3

PHYSICIANS, DENTISTS, NURSES, AND HOSPITAL BEDS IN THE
CARIBBEAN ISLANDS

	PHYSICIANS		DENTISTS	NURSES	HOSPITAL BEDS
	Per 10,000 Population	Percentage in Government Employ	Per 10,000 Population	Per 10,000 Population	Per 10,000 Population
Antigua	2.9		0.5	18.3	72
Bahama	5.9	63	0.9	22.3	67
Barbados	3.5	62	0.9	10.7	67
Cuba	8.3	51	1.8	8.1	59
Dominican Republic	1.5		1.4	0.6	41
Dominica	1.3	100	0.5	9.0	46
Grenada	2.2	80	0.4	12.5	77
Guadeloupe	4.2	100	1.3	7.4	85
Haiti			0.1	0.8	6
Jamaica	4.0	32	0.6	21.0	42
Martinique	4.1	88	2.0	8.2	125
Netherlands Antilles	7.2		1.6		74
Puerto Rico	7.0	70	1.3	13.1	50
St. Kitts, Nevis, Anguilla	2.0	75	0.7	22.0	34
St. Lucia	1.1	90	0.3	9.1	46
St. Vincent	1.2		0.1	9.7	57
Trinidad and Tobago	3.9	58	1.0	14.9	53
Virgin Islands (U.S.)	7.3	90	2.6	5.9	55
United States	14.0	7	5.7	29.6	91

gree of medical indigency, necessarily a high percentage of the physicians and medical care must be governmentally subsidized, otherwise patients could not command medical care and physicians could not earn a livelihood. Under government employ, physicians can be, although they are not always, very effectively and completely utilized. Although a physician may be classified as full time in government employ, this is based on the accepted work-week of 35-40 hours. As government salaries for physicians in most tropical areas are low and not sufficient to support a family, many government-employed doctors carry on a private practice after their salaried day has ended. Surveys have shown that most self-employed physicians devote approximately 70 hours per week to their medical practice. In areas where medical indigency is too high to permit a physician to earn a living solely by private medical practice, the combination of government employment to treat the indigent and private practice to treat the insured or financially solvent portion of the population is an economical and necessary arrangement for government in medicine. Criticism of doctors' scale of living and incomes sometimes

overlooks their long hours of work, often twice the usual union time.

The ratio of dentists to population on the Caribbean islands is relatively lower than the physician-population ratio. Thus St. Vincent has only one dentist per 100,000 population while the United States has 57 (Table 3). Dental defects may cause much pain and distress; yet, as they are seldom fatal, the public and the government are not inclined to consider them of primary health importance.

In general, many of the Caribbean islands have a relatively adequate number of hospital beds even judged by United States standards (Table 3). Haiti, however, with only 6 hospital beds per 10,000 population, is woefully behind, whereas Martinique with 125 beds per 10,000 has a higher ratio than the United States with its 91 beds. Although beds alone do not solve medical problems, they indicate the presence of a fundamental facility. The availability and quality of physicians, technicians, drugs, and nurses are of prime consideration in giving a hospital bed its maximum impact on health. In many hospitals in the Caribbean a hospital bed is largely a place for rest, as medical facilities are inadequate. In the United States there are 29.6 nurses per 10,000 population. This figure includes not only hospital nurses but also public health nurses and those of the visiting nurses associations. Several of the Caribbean islands have over 20 nurses per 10,000 population, but again Haiti with 0.8 nurses and the Dominican Republic with 0.6 nurses per 10,000 population have a shortage in this profession.

Health care requires a team of physicians, dentists, nurses, technicians, administrators, and many others. These workers in turn, in order to be most effective, require hospitals, clinics, laboratories, and extensive specialized equipment. In the Caribbean area, as elsewhere, government is attempting to provide all of these, often on an inadequate budget. Their education and training is expensive and time-consuming. The primary and probably the most insistent public demand is for physicians. However, the modest economy of most of the islands does not provide sufficient funds for very many of its younger people to finance a medical education. Nor is a career in medicine especially attractive after financial sacrifices, for the economy of many of the islands can support only a few physicians and those in government employ are usually poorly paid. Until the late 1940's only Cuba, Haiti, and the Dominican Republic supported medical schools. The other islands depended upon medical schools in Europe, the United States, and Central and South America for physician education. Government scholarships were widely awarded with the proviso that the returning physicians would serve in the government medical service for a stipulated time. During this period

Puerto Rico had 150 to 300 government-supported medical students abroad on a fellowship budget of over \$200,000 per year. Many of these students were in United States medical schools but a number of them were in schools with less demanding standards in Spanish-speaking countries. Fortunately the medical students from the English-oriented islands studied in the schools in Great Britain or Canada and the students from the French islands studied in France or Canada.

III

Although medical education abroad is the only solution for many of the islands, the British West Indies in 1948 established a medical school in Jamaica which serves all of their islands. There are approximately 25 physician-graduates each year. Puerto Rico in 1950 established a medical school which has graduated 40-50 physicians each year since 1954. This medical school, a part of the University of Puerto Rico, is supported by the Commonwealth and is an excellent example of government in medicine.

This four-year medical school was largely developed by utilizing the medical facilities already at hand in Puerto Rico. The School of Tropical Medicine, a research and training center, with a few structural changes was made to accommodate the first two years of medical education. Fortunately the School of Tropical Medicine had strong departments of biochemistry, microbiology, parasitology, pathology, and public health which were incorporated into the new medical school. The small 55-bed research hospital was altered to provide housing for 170 students. This residence hall is important, for the study of medicine is a full-time occupation and quiet, undisturbed surroundings for after-class study are required. A nourishing diet is also needed to compensate for the physical as well as mental effort. Puerto Rico is a poor country and over 85 per cent of the medical students are supported by government scholarships. Frequently, scholarship students who wish to assist their parents financially will do so by savings made at the expense of their rooming quarters or through food economies. Therefore, to insure good food and a quiet room for study, which is hard to find in San Juan, the University developed a residence hall and cafeteria for medical students.

An important facility for medical education is a hospital, for it is here that the medical student spends his third and fourth years of study and where interns and residents receive their general and specialized medical training. The San Juan Municipal Hospital with over 400 beds and an extensive clinic service became the teaching hospital of the medical

school. Over 200 physicians in San Juan were enlisted to participate, most of them on an *ad honorem* basis, in the clinical teaching. The operating expenses of the medical school came largely from already existing budgets; the scholarship fund for students to study abroad, the School of Tropical Medicine budget, the former research hospital budget, and the functioning San Juan Municipal Hospital budget. Thus with only a small additional expense a complete, accredited, four-year medical school was developed.

A medical school does much more than train medical students; much needed technicians are trained, a nursing school is developed, physicians in practice are given an opportunity to take refresher courses, the standards of medical practice and medical care are gradually improved, and research on medical problems peculiar to the area is developed. The medical school in Puerto Rico now receives nearly \$1 million a year in gifts and grants, largely from the United States, for medical education and research. Recently a dental school has been developed and integrated with the medical school.

The education of physicians either abroad on fellowship or at home in a government-supported medical school is expensive and each graduate represents a large governmental investment. In return for their free medical education, government often requires the young physician to serve for a time in an area which is without a physician, often semi-rural. It is hoped, usually in vain, that the physician will continue to practice in the area after his government contract expires. A considerable number of these physicians, educated at government expense, seek opportunity in the United States, and there is a large number of physicians from the Caribbean islands in training and practice there. In view of the large Puerto Rican and Cuban population in several of our large cities, physicians fluent in their language and culture are a distinct asset. On the other hand, this migration of physicians to the United States increases the island's shortage of doctors.

The development of a medical center about a medical school is a logical step in the development of an effective medical regionalization program. This again is well illustrated in Puerto Rico. The avowed purpose of regionalization is to buy the greatest amount and the highest quality of health care per dollar of tax or insurance money. The basic unit is the health center which functions at the community or municipal level, approximately equivalent to a county in the United States, with 50,000 population more or less. The community health center as planned has the necessary physical facilities and personnel to give public health, preventive medicine, and limited medical service including uncompli-

cated surgery and obstetrics. Government support of the community center insures preventive and curative medical care for the indigent. The insured and the financially solvent pay for these services.

Patients whose medical problems require more extensive facilities and specialized medical and nursing care are transported to the District Hospital which is integrated with as many as a score of community health centers. Puerto Rico has four District Hospitals which serve not only in the care of the sick but also as training centers for interns, residents, technicians, and nurses. Complex medical problems requiring very specialized and expensive diagnostic and treatment equipment and skilled teams of physicians, nurses, and technicians are sent to the medical school hospital.

The regionalization program as envisaged in Puerto Rico when fully implemented should give the public not only adequate but superior medical care and preventive medical service. At present 18 per cent of the budget of Puerto Rico is spent on medical and public health services.

It is important that the government-financed medical services be coordinated and integrated with private services, for although 66 per cent of the families were using the free services of government medical care, 60 per cent were paying \$50 or more yearly for medical expenses for private care.

There is every indication that government will play an expanding role in medicine in the Caribbean area as elsewhere in the world. The need for health care in the Caribbean is great and there is a tendency to use American standards as their goal. However, in view of the disparity in wealth, a more realistic approach in terms of what can be afforded must also govern their medical programs. With a high percentage of their population medically indigent government must assume extensive responsibility for health care. This has been done effectively in Puerto Rico and a number of the Caribbean countries.

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Nilo Vallejo: HEALTH EDUCATION IN THE CARIBBEAN

THIS TOPIC has at first glance less precision and hence less apparent scientific basis than the preceding topics concerning the biological and physical aspects of public health practice. It is a pity that there are so few factual data representing the social and cultural environments of the Caribbean people in comparison with other areas of Latin America. Nevertheless, I am going to present to you a general picture of the health education problems and achievements in the Caribbean area, with special reference to the eastern Caribbean.

1. Health and Social Environment

Health is a product of perfect harmony between man and his environment—biological, physical, and social. Man as an ecological animal has shown throughout his history a remarkable capacity for adaptation to his environment. He is, in fact, a result of these persistent and continuing adjustments. Medicine, as well as other technological sciences, has been well developed but there has not been a parallel development in the behavioral sciences which study the social, cultural, and educational aspects of human beings. Unfortunately, the twentieth century is characterized by the gap between the knowledge and the ability of medicine and the public's use of that ability in achieving optimum health.

Millions of Caribbean people, for instance, have never used potable water or latrines, despite the widespread availability of knowledge regarding their importance in preventing diarrheic and parasitic diseases. This is the main reason why modern health education is based on a

fair knowledge of the psychological, social, and cultural factors which influence the daily living of the people. Before teaching people about health practices it is wise to learn the role of existing habits, how these are linked to one another, what functions they perform, and what they mean to those who practice them.

Don Adams tells us this appropriate oriental fable. Once upon a time a monkey and a fish were caught up in a great flood. The monkey, agile and experienced, had the good fortune to scramble up a tree to safety. As he looked down into the raging waters he saw a fish struggling against the swift current. Filled with a humanitarian desire to help his less fortunate fellow man, he reached down and scooped the fish from the water. To the monkey's surprise, the fish was not very grateful for his aid. The conclusion is this: "The public health worker, unless he is a careful student of his own culture and the culture in which he works, will be acting like the monkey; and, with the most laudable good will, maybe he may make decisions equally disastrous."

II. Magnitude of Health Problems in the Caribbean Area

As mentioned in the other papers comprising this Conference, it is still true that many of the Caribbean inhabitants use water that is unsafe and insufficient in quantity, dispose of excreta and wastes dangerously, consume milk and food which are subject to contamination, live in inadequate housing, and are plagued by disease carried by insects and rodents. Furthermore, many Caribbean children die every year as a consequence of malnutrition or infectious diseases. In the islands which compose the eastern Caribbean area, for instance, the infant mortality rate varies from 72 to 103 (year 1963). In some, more than 50 per cent of the total deaths occur by two years of age. It has been demonstrated that the period of greatest risk in childhood begins at about 6 months of age and ends at the termination of the second year. When compared with that of a North American child, the risk of dying for a West Indian child is 25 to 30 times greater during this period of life. The two main causes of death in this age group in the area are gastroenteritis and malnutrition. Consequently, it seems obvious that attention needs to be focused on providing more and better care for the age group between 6 months and two years of age, as both of these diseases are preventable. As Van Zile Hyde has said: "The major health problem of the people is not death—it is chronic and repeated infections and infestations which convert man from a productive unit to a liability to society." Disease is inevitably accompanied by economic loss and social problems.

In a recent Eastern Caribbean Health Conference convened jointly by the University of West Indies and the Pan American Health Organization, various measures were recommended for prevention of malnutrition and gastroenteritis, including notification by doctors of cases of these two conditions and a follow-up by public health nurses of children under 2 years old who were discharged from hospitals after admission for these two ailments. The need was also felt for improvement of environmental sanitation, with the basic objectives of providing piped potable water and sanitary privies in individual homes. The application of these preventive measures demands the stimulation and development of a public consciousness regarding the importance of health, and the active participation of the community in the solution of its health problems. This is possible through public health education activities.

III. General Characteristics of the Population Related to Health

In the Caribbean area live a diversity of ethnical and cultural groups such as Europeans, Negroes, Indians (in some places called Amerindians), and Hindus. The Caribbean countries and territories, excepting the United States, have a total population of 92 million, half of them living in rural communities. There is great variance with respect to the distribution of this population among the various countries, even within a country. Approximately 50 per cent of the population is under 20. In many countries the mortality rate per 100,000 population is high, it varies from 4.4 (United States) to 233.2 (Guatemala). However, the growth rate of the Caribbean population is about 3 per cent compared to a growth rate in the world of 1.8 per cent annually. At the same time, the economic growth in the Caribbean is less rapid.

Mexico is the country in the Caribbean where industrialization is most developed, but it has not reached a complete transformation of its economy which is still based on agricultural and livestock activities. More than 70 per cent of the population is devoted to these activities. When there is a tendency to withdraw from agricultural activities and from rural areas, such as in the case of Mexico, Venezuela, and Colombia, an increase is noted in those problems which arise in developing countries. That is to say that, even now, a large portion of the people suffer from ignorance, disease, and poverty. Industrialization and urbanization, being promoters of major changes in technology, transportation, and educational facilities, cause the mass migration of peasants to the cities. This causes an increase of the slums within the city. In other words, this situation contributes to increased urban accumulation, unemploy-

ment, and the growth of slums without the most elemental public services.

The picture described above distinguishes the developing countries of the Caribbean area. These people reproduce at an accelerated speed, their economies deliver less food and manufactured goods than they need, and what is furnished is insufficient for the increasing claim of material and social elements, including those related to health and education.

In some islands which composed the former West Indies Federation, one of the principal economic sources is tourism. But the money tourism provides is wasted by the native population in buying sumptuous things such as luxurious cars or yachts rather than furnishing the essential items of daily living, such as housing, food, potable water, or latrines.

Venezuela is an interesting country from a public health point of view. There social and cultural change occurs more easily than in any other country of the Caribbean area. In the last ten years, in Venezuela the public health program has developed more rapidly than in any other Latin American country. Certain characteristics of the Venezuelan people and their institutions have provided a favorable climate for the surprising progress of public health and for the growth of a public awareness of the importance of health in national and local development at this time. The main social and cultural factors are presented below.

There is a socially integrated and ethnically homogeneous population. There are few significant clusters of ethnic minorities. While effective integration of rural Venezuelan people into the total national culture has not been completely effected, there are no institutional barriers to this steadily progressing process.

A high degree of class mobility is present. Class distinctions are largely based upon achievement and wealth. Social opportunities for vertical mobility are open; communication between individuals of different classes is relatively free and unrestricted by traditional patterns of hierarchy or subordination.

Venezuelan culture is highly flexible and adaptable to changing internal and external conditions. It is often criticized for the shallowness of its cultural creativity which had to be partially sacrificed at the expense of adaptability, especially during the first half of the twentieth century.

By Latin American standards Venezuelan society is dynamic and fast moving. These are not all unmixed blessings. The same capacity for adaptability to change and a swift rhythm of activity are frequently manifested in undisciplined ways. There is a certain impatience in submitting to preliminary processes necessary for organizing and perfecting the instruments of action.

IV. Modern Concept of Health Education

The WHO Expert Committee on Health Education has stated that "Health Education, like general education, is concerned with change of knowledge, feelings, and behavior of people. In its more usual form, it concentrates on developing such health practices as are believed to bring about the best possible state of well-being." According to this modern concept, health education consists of developing and providing learning experiences for people, causing them to change their health patterns.

V. Basic Assumptions in Health Education of the Public

In a democratic society the individual will always retain primary responsibility for his health, and that of his family and community. In health education, emphasis is placed on an attempt to stimulate the people so that they will modify their ways of living. This is best accomplished by providing a way to improve their health behavior. The health educator's role is to promote and facilitate such a development in people.

The success of any local health program is so intimately related to the prevailing socioeconomic conditions that measures taken to improve health services cannot be fully effective without concomitant measures taken in other areas as well. Accordingly it follows that progress made in improving the health of the people will depend in part upon the extent to which the activities undertaken by the Ministry of Health are coordinated and integrated with other activities for reinforcement. In this way the community will in time become more capable of solving its own problems, which is the ultimate goal of health education.

The technical awareness of the public is a basic determinant of the extent to which the health and welfare services contribute to the goal of creating a more viable and meaningful community life. As health educators, we have a major concern to insure that the services provided contribute to the fullest extent in the development of the total community. The public's interest and participation in studying community needs and planning to deal with them is the necessary tool which enables people to help themselves. Health work in the final analysis represents an effort to build more adequate communities of people; and health education is the only basis upon which to build such a community health program.

VI. Social and Cultural Factors Which Affect Health Education

In a recent Latin American Meeting of the Ministers of Health in the various countries of the Western Hemisphere, emphasis was placed on

the principal social and cultural factors which are associated with or which themselves produce the most important diseases in this Hemisphere. The main social and cultural factors are poor nutrition, inappropriate housing, lower income per capita, and ignorance which is something more than simple illiteracy.

In the Caribbean area, especially in the eastern Caribbean countries and territories, there are several social and cultural factors which represent a real obstacle to the progress of the community health education.

Illiteracy. In most of the Caribbean population there is a high percentage of illiterate people. Illiteracy represents a great disadvantage in the fight against illness and death. Costa Rica has the lowest percentage (21.2 per cent) of illiteracy. Speech is the most important means of communication, and without good communication it is not possible to promote a better understanding about health facts and to improve the health practices of the different community groups.

Poverty. The alliance between illiteracy and poverty results in a tremendous problem for the health educator whose specific contribution is helping people to achieve health through their own efforts and actions. Most of the Caribbean population endures poor living conditions due to low incomes. When a comparison was made in 1958 concerning the per capita income of 22 countries of the Americas, it was found that Trinidad and Tobago ranked sixth highest, Jamaica was twelfth, and Barbados, Leewards, and Windwards sixteenth. If the individual Windward Islands and Montserrat were to be included separately, they would have shared the lowest rank with Paraguay and Peru (although figures were not available for Haiti, which may have had a lower per capita income).

Cultural differences. The concept of culture is obviously of importance to health workers seeking to change collective habits. Once more the behavioral sciences help create respect for cultural or subcultural differences. Such group differences as food habits and religious practices are evident to alert public health workers, but it is often less apparent that cultural variation also operates in many other areas that directly affect health work; for example, varying cultural expectations with respect to personal privacy, structure of the family, and doctor-patient relationships.

In the eastern Caribbean area, great cultural differences exist which constitute serious obstacles to the progress of health education activities. For instance, it has been noted in some places that there exists an apparent lack of willingness on the part of the people to participate in self-help activities of the community organization for health. This negative attitude is a direct result of the labor unions' resistance in allowing

free work to their associates. From the point of view of health education, this attitude is explained once the social and cultural factors involved are known. In the first place, during many years, the colonial territories have greatly depended on the metropoli, giving rise to a feeling of paternalism or dependence among the local population. This paternalism is characteristic of underdeveloped countries. In the second place, the Negro group is very strong in those communities. Because the Negroes remember the slavery of their ancestors, they are firmly opposed to any kind of free work. For them, working without any salary is a form of slavery. Since Negroes control the labor unions, it is not possible to carry out any community self-help programs. Consequently, it is essential to conduct more research in the area of the nature and sources of community attitudes and behavior in respect to public health in order to discover new motivations which would bring about a desirable change in present community attitudes.

The whole complex of beliefs, attitudes, and practices associated with health, prevention of diseases, disease, and curing are called "folk medicine." Though a considerable bibliography on Latin American folk medicine exists, there is almost nothing about folk medicine in the English-, French-, and Dutch-speaking countries. In each country or cultural area, folk medicine has a core of principal illnesses for which there is no equivalent in scientific medicine. Some "folk" causes may be called rational in the sense that they are explicable on the basis of the body of empirical knowledge to which the group has access. This knowledge may be erroneous in terms of modern medical science, but it makes sense in terms of the logical premises of the local group. But there are also other causes, magical or supernatural, which lie outside the body of knowledge empirically verifiable by the group. For instance, in the Caribbean area, superstition has a decisive role in the health beliefs and practices of the majority of the population. So, in various places, the Negro population practices something like a religion. This religious practice is called *voudou* (or voodoo), which contains a considerable proportion of magic (magic is an act directed to cause damage). This magical practice (*voudou* or *obeah*) satisfies the need for a counterbalance to extreme poverty, disease, and ailment. It is a substitute for the lack of health services, but at the same time it constitutes a recreation value in its singing and dancing. Magic is a way of eluding a sordid reality.

Lack of sufficient health personnel. In the whole Caribbean area there is an acute shortage of doctors, nurses, and other professional and auxiliary health personnel with basic training in public health. This situation

gives rise to serious difficulties in the development of health education activities, since all the members of the health team have an educational impact on the people with whom they come in contact. Therefore, they have responsibilities for health education and need a basic knowledge of the process of education. The most important part of the health worker's job is to provide proper guidance for the individual and the family rather than merely to render a specific technical service.

Although all health workers have educational responsibilities, the professional health educators have specific contributions to make to the success of public health programs. These contributions include helping people to achieve health by their own efforts and actions, helping health workers to make the best possible use of all health education opportunities, and training them in the use of adequate educational methods, techniques, and approaches.

In the eastern Caribbean area there are almost no professional health educators. Puerto Rico constitutes a unique case. Since 1944-45 the School of Tropical Medicine, University of Puerto Rico, has supplied this kind of health personnel. This training program has also included a substantial number of persons from various Latin American countries who were awarded fellowships from USAID or WHO/PAHO. By 1963 there were 117 qualified health educators employed by various Puerto Rican agencies serving a population of 2,500,000. Thus the Island has a ratio of 1:20,000 health educator to population. In 1962 the Colombian School of Public Health began the within-country training of professional health educators, with technical and economic assistance from WHO/PAHO and UNICEF. Heretofore, first the Institute of Inter American Affairs, and later the Agency for International Development of the U.S.A. promoted the establishment of health education services as well as the preprofessional training and the graduate training of health educators in this area. Currently, WHO/PAHO has assumed this responsibility on a continent-wide basis.

Lack of understanding of the educational process and of the role of health education by some public health administrators and other personnel in key positions in public health. Employers have various concepts about health education. On one hand, the health educator finds himself restricted in scope. At other times responsibilities are so broad that he over-extends himself. Health administrators like rapid results; sometimes they are mainly interested in publicity. There is a limit for any community health education program. This is a problem commonly found in the Caribbean area. Furthermore, many times the health administrators have no clear idea concerning the role and the responsibili-

ties of the health educator. They often demand that the health educator help them in solving technical and administrative problems, such as carelessness on the part of the health personnel or poor coordination among the various health clinics and services. They probably believe that health education is like a panacea, which cures all ills and difficulties.

Lack of an appropriate coordination of the educational activities carried out by the health departments and other related agencies. In the majority of cases health departments carry out isolated health education activities without any coordination with those of related agencies, such as schools, extension services, social welfare, community development programs. This situation causes a waste of personnel, time, and money, and in some cases it causes public confusion.

VII. Present Development of Health Education in the Caribbean Area

The protection and maintenance of community health is one of the major concerns and responsibilities assumed by most Caribbean governments. Health education as a contributing factor has been accorded its due place in the promotion and maintenance of health.

For instance, in Puerto Rico health education has been recognized as one of the responsibilities of various agencies: Department of Health, Department of Education, Department of Agriculture, University of Puerto Rico, and other official and voluntary agencies.

As Secretary of Health Dr. Arbona says, health education as a public health tool has many aspects; but, in Puerto Rico, working with people, community organization, and team work have been stressed as most effective in helping promote good health, prevent disease, restore health, rehabilitate the incapacitated, and plan the family. Health education has been a part of the health program since health services were organized at the beginning of the century. Toward the end of World War II, a revision of the health education organization and methodology was made. As a direct conclusion it was decided that health was not only the concern of the Department of Health, but also that many other government and voluntary agencies have the opportunity to contribute to the improvement of community health through health education. It was felt, for example, that the Department of Agriculture and the Extension Service, while carrying out their responsibility to help farmers improve farming methods and crops, could also help farmers improve their health habits. Also the Department of Education has long recognized its health responsibilities, and at this time its health education activities are being replanned and intensified. Such was the case with

the Public Housing Authority and many other government and voluntary agencies. This coordination of common efforts by the several agencies is essential since health education has become a multiagency activity operating parallel to a series of community development activities. Several agencies employ full-time health educators, and others depend on the consulting services provided by the Department of Health and, in some instances, by the Department of Education. An inter-agency Committee on Health Education has been established for coordinating purposes.

It is interesting to comment on another achievement concerning the educational aspect of the Puerto Rican mental health program. It was felt that good interpersonal relations contribute toward good mental health. Consequently, health educators participated in the planning and development of human relations institutes devoted to personnel; first, for the Department of Health and Education, then for personnel in other departments, and later on for community groups. These health education activities have greatly helped health and other workers gain a better understanding of basic concepts of human behavior, so essential to a sound understanding of the educational process.

In other Caribbean countries and territories health education is less developed in spite of the continuous efforts of the international health organizations such as WHO/PAHO and USAID. Worthy of note in this group are Colombia and Panama where there are cores of well-trained health educators. Both have very well-organized health education departments, where consultative and supervisory services are provided. The central office of these departments is involved in national Planning Activities. Health educators are also assigned to most of the local health centers. Colombia has about 20 health educators at work and Panama has 8.

In other countries, such as Costa Rica, Guatemala, Jamaica, Mexico, and Venezuela, health education is less developed than in the other countries. For instance, a short time ago the activities of the Venezuelan Department of Health Education were not in accordance with modern trends in health education. Emphasis was given almost completely to the production and distribution of printed material and other visual aids. Currently, the School of Public Health through its Department of Health Education has assumed the responsibility of teaching health education for health workers who are prepared in the School. This type of work started two years ago with the technical cooperation of WHO/PAHO through the advisory services of a specialist in health education. It is expected that the teaching of health education to the public health team

members will eventually influence the development of a well-prepared health education staff at the Venezuelan Ministry of Health.

It is also interesting to mention a remarkable experiment carried out in Venezuela in connection with the community participation in the Venezuelan Rural Water Supplies Program. This community participation was achieved through management, operation, and maintenance of the rural services by members of the local community, organized in Water Boards of Administration. This Rural Water Supplies Program is still successfully operating in Venezuela since rural communities are not merely paying water rates or fares, but are participating in its activities through the work of an autonomous board called Junta Administradora del Acueducto Local. This board works independently of the municipal or local government and is composed of three members: the doctor of the medical post, a delegate of the municipal government, and a community leader (*subscriber* of the water service) elected by the community in a democratic way. The local Water Board of Administration prepares the water service budget and approves water rates proposed by the Division of Rural Water Supplies of the Ministry of Health. From time to time the Board reports to the local community the activities carried out concerning the administration of water service and running expenses. In this manner, the local community is well-informed concerning their water service, and community leaders become convinced of the importance of potable water in the social and economic development of the community.

In 1964 the Health Education Unit of the Venezuelan Rural Water Supplies Program organized 126 local management boards throughout the country, and 172 rural aqueducts were constructed and 168 are under construction in the rural areas of Venezuela, contributing substantially toward bringing health and welfare to 280,000 inhabitants. In spite of the short time, some of the boards obtain water incomes which exceed the expenditures of the management, operation, and maintenance of the rural water service; for instance, Casanay is a good example of this enthusiastic community participation and marvelous work done by the local Water Board of Administration.

The Venezuelan health education program described above seems to be an effective approach in getting full community participation in the rural water program in many Latin American countries.

In the West Indies there are few professional health educators at work, but health education activities are carried out by doctors, nurses, and sanitary inspectors. In the last two years various seminars on health education for sanitary inspectors were held in Barbados. On the other

hand, most of the time of the public health nurses is devoted to health education activities in the health clinics or during the domiciliary visits. However, the importance of health education is more evident in the Malaria Eradication Program and the Rural Water Supplies Program which are well-developed in the Caribbean area.

VIII. Pan American Health Organization Role in a Health Education Program

Caribbean governments, as well as international health organizations such as the PAHO, or the Regional Office of the WHO for the Americas, are aware that in the long run health programs are as successful as the people want them to be. Health education is, therefore, an essential tool in helping people to be healthy. In accordance with this, the PAHO is giving technical assistance in health education to Caribbean countries and territories. Besides furnishing fellowships and travel grants for studying health education abroad, the Organization has five specialists in health education working in the area. These advisers help the general public health programs in planning and developing health education activities. They are stationed in Guatemala, Dominican Republic, Barbados, Venezuela, and Surinam. Their main duties are related to the promotion and expansion of health education services in the whole area, especially the within-country training of local personnel. Moreover, the Organization collaborates in the orientation of those educational programs which, in accordance with the decision of national health authorities, have more priority than others in the common task of promoting the well-being of the Caribbean population.

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Aida B. Lizardi: SOME NURSING PROBLEMS IN THE
CARIBBEAN

A WRITER, one William Dinwiddie, was sent to Puerto Rico in 1898 by the Harper and Brothers publishing firm. He arrived on the island shortly after the coming of the Americans and the evacuation of the Spaniards. This remarkable gentleman stayed all of two months in Puerto Rico, during which time he amassed sufficient information and insight about the island and its people to write and have published, by 1899, a 252-page volume which he modestly entitled, *Puerto Rico—Its Conditions and Possibilities*. The 24 chapters run the gamut from geographic conditions, through industry, health, politics, social conditions, roads, courts, education, and religion to cockfighting. A phenomenal accomplishment, albeit a bit inaccurate, amusing, and lacking in understanding! Over the years the word “dinwiddie” has ceased to be a name or person to me. A “dinwiddie” has become a term in my own special vocabulary to typify or explain the many writers past and present who have flown into a Hilton Hotel one night and flown out the next day fortified and transformed into an authority on all subjects related to a given area and its inhabitants.

When I received the first communication asking me to participate in this Conference my immediate reaction was to accept with pleasure. However, when I began thinking about the amplitude of the topic assigned, *Some Nursing Problems in the Caribbean*, I started to reconsider. How could I possibly have the temerity to represent myself as an expert in the nursing methods of the more than 35 islands, territories, and independent nations that surround the Caribbean sea? It is true I have visited many of them through my association with the Caribbean

Nurses Organization and for other purposes of a professional nature, and I have lived nearly ten years in Puerto Rico, but this did not seem to suffice. I began to half wish that I were a bit more "dinwiddieish" and could write with ruthless abandon on the basis of a "look-see" and some incidental reading. Luckily, I was liberated from my anxieties by the next letter from Dr. Wilgus, in which he assured me that I could speak on any phase or phases of nursing in the Caribbean. He also told me, to my delight, that my audience would be composed of persons who were not members of the medical health team.

I am very pleased to have the opportunity to present and discuss with you, the consumer of nursing services, a few of the difficulties and problems that plague us and in turn have a profound effect upon you, your families, and the community in which you live.

In presenting the nursing problems of an area as vast and heterogeneous as the Caribbean it is necessary to keep in mind the varied economic, cultural, political, and social influences that exist. It is not my intent when making comparisons to judge or offend but merely to state my opinions and the knowledge I have gleaned through my visits, my work, and my contact with the vast number of Point Four students and visitors from all over the globe with whom I have had the pleasure of discussing our common professional satisfactions and difficulties.

I

Nursing in Puerto Rico is in a unique position on our comparative scale. Benefiting as we have from the tremendous general advances made by the Puerto Rican people in the past 20 years, the island's unusual political relationship with the United States, and the efficient utilization of local and federal funds, we have been fortunate in being able to improve our nursing education and nursing services far more rapidly than many of our neighbors in the Caribbean. For this reason, though we have not fully attained stateside nursing standards, we must be considered midway between the less advanced or underdeveloped areas of the Caribbean, and the very advanced state of nursing in the United States. I wish to make clear too that England, France, the Scandinavian countries, and many other nations perhaps, have highly developed nursing services and educational programs, but today since we are here in Gainesville, discussing nursing in the Caribbean, I will use the United States as the standard and measure of comparison. It is an accepted standard by those who either follow or look to the American pattern of nursing for guidance.

Whether a nurse, your nurse, working in a hospital or other community health agency knows her business and goes about it efficiently; whether her rapport with you as a patient or a family member is a warm and pleasant one; whether she provides you with tender loving care and understanding; whether she conducts herself like a professional and is a delight to have around when you require her services depends to a great extent upon the number, kind, and severity of the professional difficulties and problems she is obligated to contend with. By and large throughout our country and the Caribbean, nurses, nursing, and the users and consumers of nursing services seem to be confronted with fairly similar basic difficulties. The intensity or importance of one problem may be greater than another, depending upon local needs and priorities. At times a few unusual problems arise that are distinct and specific to one set of circumstances. Problems are numerous in all professions and vocations and nursing is hardly an exception. Truth to tell we have so many I barely know which to select and how best to proceed. I have decided, except for one minor deviation into education, to limit the problems I present today to those that relate to nursing care services. I have placed them under two headings.

II

The first I have entitled Organization and Administration—The Lack of It. This is a chronic disease in most health agencies and one which contributes more than any other to making the nurse's lot not a happy one. It is not that health installations do not have administrative offices, a director, a staff, and an organization. They do, but so pitifully little has been learned over the years from industrial and commercial know-how about employer-employee practices and the benefits derived from content and satisfied workers. I have seen public and private institutions in my travels in the Caribbean still run by a medical director in the old, strict, rigid, military fashion. I have witnessed subservience on the part of nurses which shook me and took me back into nursing history 100 years. In Puerto Rico we have all too many institutions run by a director, medical or lay, who "knows all—sees all—and does all." It is said of one director in particular that his organization is so highly centralized that he insists upon signing everything, even a requisition for a new box of tongue depressors. Many of our hospitals and public health agencies have a director for the nursing service department who is a director in name only, since according to the administration the decisions in nursing are not vested in her. Some institutions have medical

staffs so poorly organized and managed that their struggle for power and prestige is such common knowledge that it undermines the entire staff of personnel from the executive administrator on down to the janitors. And yet with it all, we do see occasional hospitals and public health agencies where the principles of good organization and management are put into effect.

What a joy and what a difference when one finds a hospital whose administration has defined its organization; set down its goals; defined its lines of authority; established a system of communications; established methods, policies, and practices; encourages and rewards staff participation and individual abilities; provides and maintains the supplies and equipment needed for its staff to function efficiently; has written personnel policies that are fair and equal for all; is democratic, permissive, and respectful of its employees; and provides for staff improvement and professional growth! This is but a brief listing of some of the more important factors that make for good organization and administration. If they are known to us, and they are, why do we persist in having the majority of hospitals as places where just the opposite prevails? Let us go back to our comparative scale. In my experience I have seen many hospital and medical administrators in the United States aware of and practicing the known principles of good administration. In Puerto Rico we have a sprinkling of enlightened and well-trained hospital and medical directors who are beginning to give more than lip service to the fundamentals of good organization and management. I cannot speak for all installations in all of the Caribbean, but where I have visited the authoritative military, direct line of command from medical administrator to his assistant and on down has been unfortunately the severe and unbending pattern that I found. Business and industry have been the pioneers in this field and the assimilation of their methods by hospitals seems to be in proportion to the degree of industrialization of an area.

Why do I consider good administration, good organization, and good management practices so vital to you the patient, family, or community member? What has this to do with you and the care you will receive? The answer is almost everything that will either make you refer to your nurses at a later date as "angels of mercy" or as hard-hearted, unsympathetic, inefficient, callous robots.

The prime concern of a professional nurse is the physical and emotional care and well-being of her patient. All the activities she and her auxiliary staff perform are centered around the patient's care. Disregarding the few who never should have entered the profession in the

first place, a well-run, well-managed, congenial organization will attract and maintain a contented, efficient, satisfied, dedicated, and normally amiable staff of nurses. Aside from the responsibilities related to the direct care of the patient, today's professional nurse must also function in most instances as a supervisor, counselor, teacher, and administrator to her practical nurses, aids, and student nurses. She acts too as liaison officer between her patient and the staffs of the supportive departments, such as laboratory, dietary, housekeeping, and so on. She is the doctor's right-hand man and often a receptionist, clerk, and public relations person as well. She can be none of these things to anyone unless the organization and its management policies and practices are such that they promote an atmosphere and climate that encourages and allows her to fulfill her obligations. She cannot give high-quality nursing care if she is frustrated by the constant shortage of linen, towels, soap, and other basic nursing care tools and supplies, or by vital lifesaving equipment that fails to work when needed or is unavailable in an emergency because too few have been issued. If the respect and confidence given the director of nursing services is such that the administration can and does countermand her orders and openly disregard her authority, insecurity and a lack of respect permeates the entire nursing staff, undermining their confidence and self-esteem, demoralizing the entire organization of the nursing service department. When a new nurse is hired and given ten, twenty, or thirty dollars more than others who have been faithfully serving the institution for many years, and this information is learned through devious channels, the older employees are infuriated and feel victimized and discouraged. It is no wonder that they leave to seek greener pastures. If the nurse must face a staggering patient load day after day without relief in sight or even promise of help from the administration, her productivity is quickly lessened, her efficiency impaired, and her enthusiasm and interest gone. She fast becomes the robot nurse. The same reaction sets in too when a nurse is put on the afternoon or night shift and promptly forgotten. Then when she questions her superiors regarding her replacement she is glibly told, "there is no one to relieve you." I am sure that some of these problem-evoking situations have a very familiar ring to you in your own professions and vocations as well. I could go on giving example after example of the problems that have their origin in faulty management practices. All too often such a setting changes a potentially effective, capable, nurse employee into one who is too exhausted, too infuriated, too unsettled, too dissatisfied to render satisfactory nursing services to her patient, to the family, or to the community she serves.

III

The second problem-producing category I call The Image and Role of the Nurse. Let me begin by telling you what I experienced myself when I began in nursing. I often say to my students that "when I was in training—in the class after Florence Nightingale—things were indeed different." At one time this bit of jest provoked a hearty round of laughter. Recently, I do believe my students accept this statement more as fact than humor. Things were different. In the dark ages when I "trained," the school I attended was given an "A" rating which meant that it was considered one of high standing. I entered it during the years of the great depression and though I feel that I graduated knowing how to give good bedside nursing care I cannot say that I am one who would welcome the return of the "good old days." In those old days, a student nurse was the lowest man on the totem pole and the graduates were not very many notches above. Nurses occupied a rather servile position in the hospital scheme of things and were not considered or thought of with any great esteem by the general public.

Though it is many years ago, I recall quite vividly one of our first meetings as probationers with our school director. Among many other encouraging pearls of wisdom which she dropped that day she said, "Yours is to do or die and not to question why," and she was not fooling! Our task was to do what we were taught following the fifteen to fifty (if needed) carefully defined steps of a procedure, or to carry out a doctor's orders as written, or to follow a rule or regulation as stipulated without question or individual judgment. We were considered a breed apart from medical students, interns, or full-fledged doctors. It was felt, I'm sure, that our inferior intellect was such that we couldn't possibly understand anything on the medical man's level even if it had to do with nonmedical matters, with the result that I never recall one meeting, conference, or educational function where the nurses or nursing students were included along with the medical personnel. I remember doing tremendous amounts of scrubbing, cleaning, washing of walls, and endless repetitive tasks like making cotton balls and folding gauze. I remember jumping to my feet as though I had been stuck with a pin whenever a doctor or any of the many nurse supervisors approached a place where I was seated. I recall making every effort not to be caught "just talking to a patient" or, heaven forbid, to an intern. I can see myself now taking stock of everyone waiting for an elevator to be absolutely certain the doctors entered first, then the nurses of higher rank and anyone else who had the aura of importance, before I made a move to get

in. Even as a graduate nurse I could have been dismissed for doing such tasks as removing a needle from a vein, reading a sugar tolerance test, or taking a blood pressure. These were doctors' functions and I had no business trespassing and practicing medicine. Over-all planning, budgeting, purchasing for nursing, were done for each ward or floor by some mysterious office without the counsel or advice of the nursing staff who worked there. If a major improvement to the physical plant was anticipated, it too was carried out without the nurses ever reviewing the plans or offering a suggestion. To me nurses should work for the patient and the community but with the doctors, administrators, and the other paramedical personnel.

Nursing and the attitudes of others toward it have changed considerably in the past thirty years in the United States. The nurses have striven to upgrade the educational programs which are the basis of good nursing anywhere. We have worked toward defining our purposes, goals, standards, and functions. We have succeeded in becoming an accepted and respected member of the health team. We have matured into professionals proud of our skill and knowledge and confident of our performance. The medical staff today views us as reliable adjuncts who continue to be their eyes, ears, and brains when they leave a patient's bedside. They solicit and listen to our nursing recommendations and respect us for the set of abilities not possessed by them. We form part of the clinical group whose particular talents are pooled to alleviate, cure, restore, and rehabilitate. We are included and participate in all meetings, conferences, patient care discussions, and even social gatherings that have a bearing upon us and nursing. We have assumed as time has passed more of the functions that were once in the doctor's realm, more than even we believe we should assume in some instances. The administrators value our contributions, regard what we do as important, and consider us a part of their staff neither inferior or superior to the other health care personnel.

Nurses work along with the others toward the attainment of a common goal whose focus is the patient. In addition the public's picture of the nurse and its idea of what she is and what she does have been improved by the altered attitudes of our health team colleagues, by our own efforts to improve our relationships, our preparation, and our professionalism, and have been aided by an advancing society that now accepts the professional woman with a far more enlightened point of view.

I wish I could say that this rosy picture prevails in health institutions throughout all the fifty states. It does not. Here again the comparison

of the three gradations of attainment are similar. It is highest in the United States, and in Puerto Rico it has reached a half-way mark. When I came to the island ten years ago I found the nurses in the midst of a very familiar struggle to convert their subordinate almost domestic role into one of a professional. Coupled with the normal obstacles of a society to this kind of growth, the Puerto Rican nurses have the hurdle of the traditional Spanish cultural pattern of "the place of the woman" to overcome. In the past twenty years noticeable progress has been made. For example, where once the objection of parents of the middle or upper bracket families to daughters entering nursing was definitely and sometimes violently negative, we now find many young women (and men) from homes of all levels of society entering our schools. We still retain too much of the good old days however, and can find many of its practices and ideas being perpetuated. In the hospitals that follow the military pattern of administration it stands to reason that the amount of progress toward team functioning is limited. A militaristic regime intimates the production of a chief and his subordinates drilled to react spontaneously and to follow commands without question. I know of many individuals and groups hard at work trying to change this system, for they are aware, as I am, that only when a nurse is proud of her calling can she carry out her duties with dignity and self-esteem and be secure in the knowledge that she is a respected member of the health team and can perform on the expert level that you the consumer are entitled to.

I mentioned before that I was going to deviate from nursing services into nursing education for one small point. It is to offer you an example of a problem specific to one area. The schools of nursing and their educational programs in the entire Caribbean, including Puerto Rico, have based their curriculums, their administration, and their faculty activities on the pattern used by the larger country to which the area has been or still is affiliated in one way or another. Therefore we see nurses educated, for example, under a pseudo English, American, French, Dutch, or Spanish system. The nurse is being taught to function and practice in a setting completely alien to that of the mother country. She is not readily able to work or study in the other islands, territories, or independent nations of the Caribbean since the requirements, standards, and curriculum of her school, plus the qualifying and licensing practices, are so different that this interchange is practically impossible. This is a good example of a problem peculiar to our part of the world, and many nurses and nursing groups have advocated and would welcome an intensive study in the Caribbean to determine the possibility and feasibility

of an educational program for nurses which would prepare them to care for the type of patients, work in the type of communities, and practice the type of nursing best suited and adapted to the Caribbean as a whole. It need not be the French, English, American, Dutch, or Spanish method though it may benefit from the worthwhile aspects each has to offer.

For me to attempt to enumerate and discuss the many positive things that are being done throughout the nursing world to improve and change even the problems I have presented would constitute a paper in itself. The striving to upgrade, to elevate, and enhance goes on continuously in every small, medium, or large island, territory, or country in the Caribbean and in the fifty states of the United States. This work is being carried on by nurses and interested medical and lay people through international, national, and local nursing organizations, allied professional organizations, philanthropic foundations, forward-looking governmental agencies, and private citizen groups. I am confident that the next ten to fifteen years will bring about remarkable achievements in nursing as this "rocket-propelled, man-on-the-moon era" in which we live seems ripe for leaving the good old days behind in the wake of progress.

IV

During my nearly ten years in Puerto Rico I had two intensely interesting professional experiences which I consider excellent examples of things being done to overcome or lessen some of the nursing service problems. I am going to outline very briefly what was attempted in a project known as Regionalization and explain how through its unique organization and philosophy it expects to assist nurses in their quest to perform nursing functions only.

In August, 1956, in the Department of Health of the Commonwealth of Puerto Rico, a comprehensive experimental project was undertaken to decentralize and regionalize the health and welfare services in an area in the northeastern sector of the island called Bayamón. This region included 16 municipalities of which one was the city of San Juan. It had a total urban and rural population of 515,000. Financial support from the Rockefeller Foundation and the United States Public Health Services was requested and obtained to support the project. A Regional Office of Coordination and Research with its director and staff (the Research and Study Group) was organized in Bayamón by the Secretary of Health. He delegated to this office the supervisory services and necessary personnel from the Division of Hospitals, Public Health and Wel-

fare. The Research and Study Group, composed of specialists in the medical and major paramedical divisions of health care, was given the task of integrating the health and welfare services and organizing and administering them on a regional basis. The goal of Regionalization was to organize, coordinate, and integrate the curative, preventive, social, and rehabilitative aspects of patient care, conduct "operation research" on methods and techniques related to the physical facilities, manpower, and other available resources in order to develop within the region the highest service standards and comprehensive health services to satisfy the special needs and characteristics of the region. The active project lasted four years. Many of the recommendations, ideas, and methods which resulted from the efforts of the Study Group were accepted by the Department of Health and put into effect in the upper-level reorganization, which followed shortly into the other regions that were later established.

The specialists who made up the Study Group also had the responsibility in their own fields to direct and coordinate their services. I was the nurse member of the Study Group and the Regional Director of Nursing. My staff and I truly had a rare nursing opportunity. Within the bounds of the Regionalization philosophy and keeping our common goal in mind we were given the freedom to investigate, plan, discuss, and evaluate the existing nursing situation in the Bayamón region. We were encouraged to use our own minds and to analyze the traditional methods, techniques, and routines objectively and without fear. We were expected to be creative. We brought our findings, recommendations, and suggested experiments and projects, as well as our problems, to the Director and the Study Group at our weekly Friday meetings. Here, ideas were discussed, plans reviewed, and over-all coordination and methods of approach agreed upon. The story of the many interesting changes in nursing, the new or revised programs, the studies, the differing concepts, the revision of attitudes, and the integrating of functions which this new look brought about is chiefly the story of a cast of characters whose otherwise complacent minds came alive under a permissive, exciting, stimulating organization. Given the opportunity to grow, nurses became leaders. Given the backing, support, and approval of their administrators, they blossomed forth into forward-looking, action-taking people. Relieved of their dread of reprisal and given assurance, they lost their reticence, spoke up, were heard, and listened to. Nurses entrenched in individualism or in specialization became multipurpose in function—whole nurses to care for whole people. Given counsel and the opportunity, nurses began to welcome more preparation and training and

were eager to help and teach those on their staffs to learn and produce more. It was one of the most thrilling periods of my nursing career and proved to me without doubt that though there are many other problem-areas in nursing, especially in the Caribbean, the majority of the difficulties that confront us could be minimized under an efficient, just administration. Though money helps solve many ills it is not really the most vital ingredient in curing the dissatisfactions that our nurses in particular suffer. If the Regionalization Project did no other thing for me, and it *did* a great deal, it pointed up the amazing impact that the combination of good leadership, dedication to an ideal, team functioning, and fair play has upon any normal human being, and particularly if that human being happens to be a nurse.

The Regionalization Project played a part in developing the Medical Center of Puerto Rico. The Medical Center has a unique composition and unusual administration. The University of Puerto Rico, the Puerto Rico League Against Cancer, the Government of the Capital of San Juan, the State Insurance Fund, and the Department of Health of the Commonwealth Government were the original sponsoring agencies. A Board of Directors made up of the heads of the participating entities, plus the President of the Puerto Rico Planning Board, directs the activities of the Center. It is done so through the General Administrator of the organization called the Medical Center Service Corporation which the Board created to plan and administer the centralized services. The more than 32 services, some already in operation, are to be used in common by the participating agencies.

In relation to nursing, I believe the following quotation from a document of the Puerto Rico Medical Center entitled "Purpose of the Project; and its Development and Progress" (June, 1961) explains concisely and accurately why I believe the Medical Center of Puerto Rico has a philosophy which helped nurses to nurse and relieved them of many of their problems.

The basic purpose of "administration" is to provide to the professional medical personnel and the auxiliary and supporting personnel the facilities, services, and general assistance necessary to enable such personnel to give maximum concentration to direct patient care and achieve maximum utilization of their skills, time and effort in such patient care, by freeing them of such tasks as are not necessary of such personnel. The proposed organization structure for the Medical Center is geared towards that purpose.

Part VI

AGENCIES ENGAGED IN HEALTH ACTIVITIES

**E. Ross Jenney: THE PAN AMERICAN HEALTH
ORGANIZATION IN WHO AND THE CARIBBEAN**

I. Organization

IF WE SEARCH for the beginnings of worldwide cooperation in health, we need go back only as far as the Health Organization of the League of Nations. This was the beginning, recent as it is in history and short-lived as it may seem in retrospect, of the global view of cooperation in human health. The Health Organization, however, was one of the most successful and lasting of the special bodies of the League of Nations and, while it cannot be said to have been reorganized, its history was certainly in the minds of those who met in San Francisco in April, 1945, to design the framework of the United Nations. A committee established by the Economic and Social Council met in New York in June, 1946, for the purpose of creating an organization to provide for coordinated worldwide action to cope with health in its broadest definition. Following a period in which the movement was represented by an interim commission which moved to Geneva, the World Health Organization (WHO) was finally established, incorporating 55 separate countries.

But when WHO considered the matter of segmenting its work by regions, it was immediately recognized that in the Western Hemisphere there already existed the oldest of all the multilateral health agencies, the Pan American Sanitary Bureau. This veteran Organization was created as the International Sanitary Office in the year 1902, as a result of the first Pan American Sanitary Conference. Recognizing the possible duplication that would exist if the Pan American Sanitary Bureau and WHO were to operate separately, the decision was made to permit the Pan

American Sanitary Bureau to serve as a Regional Office of WHO for the Americas, although retaining its identity.

Incorporation with WHO has been a convenience of immense mutual benefit, expanding the flow of information, internationalizing the personal contacts in Western Hemisphere health circles, and enlarging the working scope of the staff of the Pan American Sanitary Bureau itself. Although the Bureau was organized largely for the purpose of reaching reciprocal uniformity in quarantine procedures, it had become, long before its incorporation with WHO, a central consulting office for the Health Ministries of the American republics, providing a coordinated service for program development and exchange of information. Therefore, it fitted into WHO with but slight modification of operating procedure and policy.

The Region of the Americas under the PAHO/WHO has its headquarters in Washington, with its area of responsibility broken down into six zones, with headquarters in Caracas, Mexico City, Guatemala, Lima, Rio de Janeiro, and Buenos Aires. The areas described as Caribbean and Central American therefore involve parts of Zone I, Zone II, and Zone III.

II. Functions

The scope of activity of the Organization covers the entire field of human health in its broadest definition. The wide span of endeavor in activities leads to functional impingement on the fields of other bilateral and multilateral agencies, requiring skillful coordination to insure complementary rather than overlapping programs. The Organization combines forces with UNICEF and also with AID in many projects, particularly in malaria eradication.

Since human health is affected by all facets of the world's environment and by all the conditions of society, the scope of activity when dealing with health in its broadest definition is almost limitless. The chief foci of endeavor are in planning, research, eradication or control of all communicable diseases, and environmental sanitation in all its aspects, including water, sewage disposal, occupational health, and rural sanitation. In the field of health promotion, the Organization is involved in general health services, the special services of nursing, veterinary public health, laboratories, vital statistics, legislation, and administrative methods, as well as in specific programs for medical care, maternal and child health, nutrition, dental health, radiation, mental health, and others.

One of the most important activities is in the field of education and

training, accomplished partly by giving courses, conducting seminars, and supporting existing institutions involved in medical, nursing, and veterinary education, etc., and partly through a large fellowship program, in which selected personnel are placed for limited periods of post-graduate training in various institutions in the Americas or elsewhere.

The methods of achieving objectives are chiefly through the assignment of specialists at headquarters and in the field. Sometimes, as in the case of malaria eradication, entire teams of specialists are assigned to each country. In other fields of activity where it would not be feasible to assign an individual in each country, as in the case of leprosy, a single adviser may serve a group of countries, usually a zone. In many instances, the requirements of a specific problem may call for a short period of counseling rather than a full-time assignment of a specialist. In these cases, the Organization selects a highly qualified person, who is then assigned to the problem area for a period of a few months. The official link between the Organization and each country is always through the Ministry of Health, although in many cases the operation itself may represent an activity for which another Ministry is responsible.

The Director General of WHO, in Geneva, is Dr. Marcolino Candau of Brazil. The Director of PAHO and the Region of the Americas, in Washington, is Dr. Abraham Horwitz of Chile. The total budget for the year 1962 was \$50,000. For 1965 it is \$17.3 million, representing an increase of 6.6 per cent over 1964. The funds are derived from four main sources: (1) from the regular quotas from member countries in the Americas (about \$7 million), (2) from WHO world budget (about \$3 million), (3) from other sources in the UN (about \$2 million), and (4) from special funds for malaria, water supply, and nutrition plus grants from the National Institutes of Health, Kellogg Foundation, and others (about \$5 million). There are now 27 member governments in PAHO and personnel number just under 1,000, of many nationalities.

III. Malaria Eradication Programs

Fifteen or twenty years ago, there were an estimated 300 million cases of malaria in the world each year, resulting in approximately 3 million deaths annually. Many attempts have been made to evaluate the economic drain on the world's economy caused by this disease, but it is so enormous and complicated that it defies actual measurement. We know that absenteeism in mines, factories, road-building projects, and plantations has been impressive and often two or three laborers have had to be fed and housed in order to have one consistently working. This,

naturally, has produced a tax on all the raw products of the world that come from the malarious areas. Even now, when you buy a dozen bananas, the price is a little bit higher because of malaria, and the same is true with every ton of iron ore, petroleum, or other malaria-taxed product. It has been calculated by experts that the continued loss in productive labor in a community where malaria is prevalent averages about 20 per cent of the total manpower. Consequently, private companies, such as the United Fruit Company, have made strong endeavors to control or to eradicate the disease on their plantations.

Absenteeism in school has had a damaging effect in the progress of education. In many areas of the world, malaria still causes a continual absenteeism from school up to 50 per cent of the attending students and sometimes more.

Economic calculations are recent but the disease has been with us throughout history. We know that Alexander the Great died of malaria in Bagdad and we know that his armies took the disease back to Greece. Indeed, there is much evidence that the decline of the Greek civilization was actually due to the high incidence of malaria beginning at that time, for it is a disease that has a chronic effect of decreasing initiative as well as physical stamina. This was the period which has been described as "those years when the Greeks ceased to create and began to comment." Malaria had a profound effect in the efficiency of the Roman army in the declining years of the Empire. At one time so many popes were dying of the disease that the Vatican was temporarily moved to Avignon. But malaria was by no means limited to the Mediterranean and tropical areas. Between the years 1828 and 1832, no less than 50,000 people died of malaria in Denmark; and in the United States, prior to World War II, there was an average of 6 million cases of malaria every year, mostly in the southern states. The "ague," mentioned so frequently in early American history, was malaria.

In 1954, in the Regional Meeting of WHO and PAHO in Santiago, Chile, the proposal was adopted to endeavor to completely eradicate the disease from the Western Hemisphere. The next year, at the meeting of WHO in Mexico City, the same decision was extended to cover the world.

The question is, then: Why was it possible to make such a dramatic decision in 1954? Feasibility was based upon two necessary factors; the first was a certain fortunate behavior of the female anopheline mosquito, and the second was the possession of an insecticide with residual killing power. The first of these is simply that the female anopheline has the habit of resting at a distance of a few feet from persons from whom she has obtained her blood meal. Being heavily laden, she cannot fly very

far. After digesting her meal and acquiring the malaria plasmodium, she eventually bites a second person and transmits the disease. The objective is to catch her while she is resting. We have no such advantage with the African tsetse fly, an insect which after biting flies far away in the dense undergrowth of the forest.

The problem, then, is to prepare a wall (the usual resting place) in such a manner as to kill the mosquito during her resting stage. This is possible only when the insecticide is effective over a long period of time, because it is obviously impossible to spray all the walls every day. This is the second factor necessary for eradication. With the possession of DDT, the true residual killing power of which was first scientifically determined in 1943, in Orlando, Florida, we have this possibility. Every wall of every room of every house in the malarious area must be sprayed and this is repeated every six months, or less frequently in the case of some of the newer insecticides.

Of course, it is not as simple as it may seem. In the first place, Nature has her protective mechanisms and we soon discovered that mosquitoes were developing a resistance, not only to DDT but also to dieldrin and other insecticides. This is particularly true when insecticides are being used for agriculture, so that a sublethal dose reaches the mosquitoes in the surrounding forest. In Central America, our chief difficulty in this respect is at the borders of the areas planted with cotton. The surviving mosquitoes produce offspring with some resistance and the survivors of the second generation produce offspring with still more resistance, and so on. Another problem is that in tropical houses, the mosquitoes can often fly through the walls and alight on banana leaves or tree trunks, which we obviously cannot spray; or, as is particularly the case in the Amazon Valley, people sleep in hammocks in the open, so the mosquito has no wall to rest upon. Another problem also caused by agricultural plantations is the movement of migratory workers, who carry malaria back to their area of residence or vice versa.

As each problem arises solutions are developed. Changing an insecticide very often solves the problem of resistance. Sometimes it is necessary to resort to the well-established method of larviciding, by attacking the larvae in their watery breeding places. The most important and effective of the solutions, however, is the use of mass drug therapy, which is literally a process of protecting the mosquito from man; in other words, making the human being safe to bite. Drug therapy requires the actual consumption of a certain dosage at certain intervals, usually a week or two. It involves contacting every human being in the area at regular intervals. Large supplies of drugs cannot be left with the

family because they may be thrown away or sold or they may represent a danger for young children. In some areas, the difficulty of this problem has been approached from another angle, in that the drug, usually chloroquine, is mixed with salt just as we mix iodine with salt for the prevention of goiter. But this requires complete control of all the salt entering the area, and sometimes a black market develops which provides nonchloroquinized salt for those who object to the medicated product. And here, once again, we face the problem of the malaria parasite developing resistance to the drug itself.

Malaria eradication takes place in four specific phases. The first is preparatory, which is devoted to mapping the area, determining the population, estimating the needs of manpower, insecticide, sprayers, and vehicles, and actually calculating the number of square meters of surface to be sprayed. The second is the attack phase, which is usually in terms of spraying but may include larviciding and drug therapy. The third phase is consolidation, in which malaria has been completely controlled but the few remaining cases must be studied epidemiologically. The fourth phase is the maintenance, in which transmission of the disease has been stopped but surveillance continues until eradication can be assured.

In the Caribbean area the countries have developed their programs in such a way that in most cases from 30 to 80 per cent of each country's territory is now in consolidation. In the case of Panama, this has been accomplished only in the Canal Zone and in small adjacent areas. British Honduras, Jamaica, Trinidad and Tobago are all in total consolidation; and in all of the Windward and Leeward Islands which had malaria the disease has been eradicated or the campaign has reached consolidation. One of the most remarkable of the accomplishments in the Caribbean area is the near eradication in most of Venezuela.

Essentially, our problem in malaria is that since the eradication of the insect vector is impossible, the solution is simply that of interrupting transmission until the plasmodium disappears. The program as it is today is the largest cooperative international endeavor ever undertaken in peace time in the entire history of the world. It frequently has been misunderstood, underestimated, and inadequately financed, but it has been proven feasible and is advancing successfully. It costs about \$25 million per year in the Americas but the important financial aspect is that, once accomplished, no more money need be spent on control measures. Its final purpose is to rid the world of one of its unnecessary burdens, one which has for centuries taxed human life, endurance, and productivity.

Fred W. Devine: CARE IN THE CARIBBEAN

THERE EXISTS at this Conference a great deal of justifiable curiosity about the part played by a private foreign aid agency like CARE in tackling the manifold problems connected with the subject of health in the Caribbean region.

Your own concern with the public health of our neighbors, as the themes of your discussions indicate, led of necessity to searching reviews of related subjects. With what I hope will not be regarded as an inordinate amount of proprietary pride in the organization I represent, let me say that none of the diversified and specific problems you have discussed here for the past several days have remained entirely strange to us at CARE during the years that we have administered the voluntary aid efforts of the American people in behalf of their Latin American neighbors.

We, too, are interested in proper nutrition and in the fight against the debility diseases that are caused by the lack of proper food. Like you, we are interested in the growing of more food, in more efficient farming, in the development of water works, irrigation, proper sanitary facilities, and in the spreading of the basic knowledge and skills necessary to accomplish these things.

Your presence here and the earnestness of your deliberations are proof that the majority of Caribbean and Latin American countries cannot be expected for quite some time to come to muster either the technical know-how or the skilled manpower to solve by themselves the multifaceted problem of health improvement. What progress in health and general living conditions can be achieved in the immediate future must therefore be left largely to whatever outside initiative and effort can be marshalled for that purpose.

That means, of course, foreign aid in one form or another. And I dare say that by ventilating here the entire complex of health needs for the Caribbean area, you have brought into a single focal point the whole problem of foreign aid for this part of the world—whether such aid be initiated by the United States government, inspired by United Nations and OAS organizations, or carried on with public support by United States private voluntary agencies such as CARE.

If I address myself here tonight to the problem of American aid for the Caribbean region, I hope to have your indulgence when I limit myself to the specific aspect of “private” voluntary foreign aid.

I

I cannot lay claim to expert knowledge of all the ramifications of governmental foreign aid. By its very nature, the massive material, financial, and technical assistance rendered by the United States government to underdeveloped and emerging countries throughout the world is frequently suspected of ultimate political motives by the very people who are its recipients. I would prefer, therefore, to take my illustrations of the efficacy of foreign aid from the accumulated experience of the one—private and voluntary—agency with which I am thoroughly acquainted—CARE.

I believe I have good authority for putting these limitations on myself. The United States government itself is laying increasing stress on the importance of the private sector of the whole foreign aid complex. In a recent newsletter, the Alliance for Progress, a governmental agency, emphasized, “Frequently overlooked are the steadily growing activities of a number of private organizations which are promoting hundreds of small, immediate impact projects throughout the hemisphere.”

The growing understanding that private voluntary agencies have a grass-roots approach to foreign aid which enables them to reach people who would remain untouched by government-to-government assistance led some time ago to a now famous “people-to-people” aid conference at the White House. Attended by all the voluntary agencies registered with the State Department, the conference ended with an appeal to the American people to reinforce governmental assistance with private aid.

As far as CARE is concerned, I am certain that Miss Ruth Puffer and Mrs. Janeiro Schmid, of PAHO; Dr. Werner Ascoli, of INCAP-Guatemala; Dr. Ross Jenney, of WHO; and others among your conferees who have been able to observe CARE in action, will bear me out in the contention that CARE has addressed itself with singular purposefulness and

outstanding effectiveness to that mandate, while simultaneously collaborating closely with other agencies, indigenous as well as international in character.

Most of us are familiar with the FAO study of several years ago and its blunt conclusion that approximately one-half of the world's people are going to bed hungry every night. Just one glimpse of the disastrously low caloric intake in countries like Haiti and Bolivia is convincing proof of how great that need for more food really is.

And in the foreseeable future, the need is apt to increase rather than diminish. The population throughout Latin America is increasing at a rate of 3.2 per cent annually, and is exerting an ever heavier pressure on the available food supply.

Some of you may be planning to attend the Pan-American Assembly on Population Problems, called for early next year by the Association of Colombian Medical Colleges at the Universidad del Valle in Cali. I am assured that increased crop production in the Caribbean countries will be one of the major topics of the Assembly.

Meanwhile, for the sake of the world neighborhood, our first aid must be directed toward feeding the hungry—but feeding them, I say, preferably with a greater variety of food with higher nutritive value than the predominantly starchy diets on which the great majority of the Caribbean people exist.

II

Fortunately, in the United States we have at the moment a reservoir of agricultural abundance, which is being put to use to fight hunger. Under the now justly famous Public Law 480 of 1954, and amended under the late President Kennedy's dramatic "Food for Peace" program, the United States government is making available to organizations such as CARE large quantities of these agricultural commodities, to be used in school lunch and other institutional feeding programs, or to be distributed in quake, flood, and other disaster areas, to refugees, the unemployed, the disabled, and others greatly in need.

Over the past decade CARE has distributed an overall total of \$67.25 million worth of American aid of all kinds in an even dozen Caribbean and nearby Latin American countries. Some \$60 million—almost 90 per cent of the total—was for food.

That sum constitutes the value of 215 million pounds of United States agricultural products, such as powdered milk, flour, wheat, corn meal, butter, cheese, shortening, and salad oils. The total also includes the

weight and value of baby food, cookies, fortified milk products, and other high protein foodstuffs that were donated to CARE by private American manufacturers.

Ranging from slightly more than 2 million pounds for British Honduras to 107 million pounds for Mexico, these foods went into regular daily school lunches for $4\frac{1}{2}$ million children, and provided an additional 2,200,000 people of these twelve countries with regular rations through mother-and-child health stations and other distribution centers. In Haiti, for instance, 100,000 hurricane victims besides 68,000 children were included among the recipients.

Statistics, even as staggering as these, can be pretty dry. So I shall not make the whole matter even drier by treating you to an extended technical explanation about the practical implementation of our various food assistance programs. It seems necessary, however, for the clarification of CARE's role, to point out one thing. Wherever possible, CARE attempts to enlist the active participation of indigenous central, provincial, and even local government authorities, as well as the cooperation of private welfare and service organizations in the full scale of its various aid programs.

Such support is not always forthcoming. A country like Haiti, for instance, may actually not have the funds to enter into a "partnership agreement" with CARE and to share the supervision cost of a school lunch program. Still, the people of that country are more badly in need of supplementary food than those of a neighboring country whose governing bodies are more able or willing to cooperate. In such cases CARE appeals to the American people for contributions to its Food Crusade.

On occasion CARE may find it necessary to reinforce the surplus food components of these Food Crusade packages by purchasing rice, margarine, or canned meats on the open market, to add variety and protein-rich nutriment.

Without the public's support of its Food Crusade, CARE would not have been able to assist the people of Haiti, who are by all means the poorest and worst nourished in the whole Caribbean area. Despite the country's long history of social and political unrest, CARE has found no difficulty in carrying on its canteen or school lunch feeding program for the past five years.

During the current year alone, this assistance reached a total of more than $7\frac{1}{2}$ million pounds of United States surplus commodities, valued at \$605,000. These were supplemented by CARE with 362,000 pounds of fortified milk and 106,000 pounds of dehydrated potatoes, purchased on the open market at a cost of \$223,800. In the particularly needy Haitian

northwest region, some 6,000 families, numbering nearly 40,000 people, are receiving regular CARE assistance on the basis of special ration cards.

Since a sizable percentage of Haitian children are *not* going to school, the usual pattern of a lunch program with the local school serving as distribution center had to be superseded by a new and more inclusive method. The answer was found in a regional "canteen" set-up. CARE enlisted the cooperation of local community committees and religious groups for the establishment of a chain of some 300 of these canteens, each of which is now feeding 300 to 700 children daily. In addition, some 52,000 children are receiving their daily lunch at school.

By contrast, the school lunch program for 220,000 children in the neighboring Dominican Republic is carried on as a partnership program, with the Dominican Ministry of Education representing the host government and assuming the cost of interior transportation and administration.

For various reasons, active participation on the part of indigenous private and government agencies, from a local junta to a Ministry of Health, remains a highly desirable side effect of foreign aid. First, it has been our experience that such involvement not only tends to remove the onus of charity from our food gifts and other material support, but also eliminates the suspicion that this aid, coming as it does from the United States, is politically motivated.

Secondly, and probably even more important: A share in the administration and supervision of school lunch and other aid programs puts a direct responsibility on the shoulders of indigenous governments and local private agencies, and thereby, of necessity, it tends to strengthen democratic processes in a part of the world normally not credited with an overabundant sense of social liability.

Thirdly, and I believe this point most important because of its portent for the future: Participation on all levels, from a barrio committee to the central government of a given country, provides a social and if you will political training ground for the people who are actually and deeply interested in the welfare of their fellow citizens.

The Guatemalan or Colombian school teacher who has enlisted to help prepare the daily school lunch for the village children, who has faced the involved need of storing CARE supplies carefully so that neither rats nor weather will spoil them, who in turn had to recruit volunteers to cut the necessary fire wood, and who had to see to it that the water for the fluid milk and the daily stew came from unpolluted sources, he or she can never willingly and comfortably fall back on the role of a mere onlooker.

Such personal involvement on the part of the people most directly concerned constitutes in my opinion the most hopeful effect of our aid to Latin America. Proud as we may be of our record, there would be little purpose to our aid efforts if somehow they would not lead to a more lasting result than the immediate need of filling empty stomachs. Were our aid simply confined to providing an occasional square meal, or even regular rations over a period of time, and then ceased again without having laid the foundations for more permanent improvement, there would indeed be little cause to boast of the scope and impact of our assistance.

The most immediate benefit of any school lunch program has universally been found by qualified medical observers to be an increase in the weight and general health of the children, coupled with a higher attendance record and a corresponding greater attention in class.

But aside from these highly desirable health and educational effects, a school lunch program, or for that matter any planned food assistance, engenders a veritable chain reaction of attending problems.

Even the simplest village feeding program may necessitate the cutting of several miles of feeder road through the jungles, and perhaps even the construction of a bridge or viaduct, before CARE supplies can reach a given barrio at all.

III

With more children attending school, it may become urgent and imperative to build an addition to the present school, or even erect an altogether new and multipurpose building that can double as school, community center, and perhaps even medical dispensary. Clearly, projects of such dimensions cannot be accomplished single-handedly. They need the voluntary labor of the *campesinos* themselves. They depend for their solution on the organized self-help efforts of the community as a whole.

Nearly fifteen years ago, CARE came to the conclusion that "the best way to help others is by helping them to help themselves." By today, that particular sentence has become the common property of all agencies, governmental and private, who are concerned with foreign relief. But to us at CARE, the slogan seemed the quintessence of an altogether new foreign aid policy. It marked a new departure, an entirely novel approach to foreign aid. It changed the character of foreign aid from relief to rehabilitation.

We felt it was more beneficial for a man to grow his own food than

to depend on charity. But how to grow more and better food without proper implements? Or without some basic knowledge of crop rotation and irrigation? The slash-and-burn method of cultivation, assisted by the Biblical plow derived from a crooked tree-trunk, had obviously failed to provide even a bare subsistence for a majority of the world's people. It was evident, therefore, that what was needed to make the new self-help aid concept work was tools.

And lest I be misunderstood, let me say that in the self-help dictionary of CARE the term "tools" includes a farmer's hoe as well as a surgeon's scalpel, a well-digging rig as well as a mobile health unit.

Under its self-help program, which is entirely sustained by the voluntary contributions of American citizens and civic organizations, CARE has fostered the construction of schools and village community centers, has brought implements, plows, fertilizer, insecticide sprayers, and even vegetable seeds to villages, to 4-S Clubs and other rural youth groups throughout the Caribbean area.

CARE classroom supply kits and prefabricated desk-and-bench sets have converted the empty shells of new school buildings into comfortable places of learning. Tool kits for various trades have endowed old and new schools with the means to add vocational training to their curricula. In case of some specialized technical schools, CARE provided even the full mechanical equipment of workshops for carpenters, metalsmiths, and other trades.

CARE sewing machines and needlecraft kits, medical first aid and midwifery kits have by now become part of the standard equipment for community centers throughout Latin America.

In making available large numbers of Cinva-Rams, the rammed-earth, building-block casting machine originated by the Centro Interamericana de Vivienda, the Housing Research Center of the OAS, CARE is providing communities everywhere with an inexpensive new building material of great durability. As the result, substantial buildings are now beginning to take the place of thatched-room, mud-and-wattle structures of the past.

To illustrate the impact of such intensive self-help aid on a very small scale let me cite the example of twenty *campesino* families who are hacking a new settlement out of the dense jungle lands of the Vaupas region in Colombia. The site is located not far from the Brazilian border in the valley of the Vaupas River that has given the whole region its name.

The new village is so remote and isolated that supplies have to be air-dropped to these pioneers by the Colombian Air Force. CARE food and

tools needed to clear the land—machetes, axes, saws, grubbing hoes, and spades, and carpenters and masons kits—come to them from the skies to help them in the quest for new homesteads. Their resolution to win out against all odds is exemplified in the name they chose for their settlement. They call it the “Abraham Lincoln Village.”

These twenty heroic families seem to exemplify in some manner the determination with which the Colombian people are devoting themselves to repair the damage done to their country and its economy during a decade of civil war.

By the time hostilities ceased, in 1957, CARE had already established school lunch programs in four autonomous departments of Colombia and some of them were in close cooperation with SCISP—the Servicio Cooperativa Interamericana de Salud Pública. CARE followed through with the distribution of additional foods to needy families, orphanages, and other institutions, medical supplies to hospitals, and tools and equipment needed to rebuild houses and place devastated acres under cultivation again. Whenever people manifested the willingness to build new lives and raise their productivity and living standards, CARE came to their aid, delivering food and tools by jeep, truck, mule, and canoe.

IV

Such aid took on a more definite form when the CVC—the Cauca Valley Corporation—and the School of Medicine of the University of Valle joined with CARE in establishing several community development pilot projects.

If these first localized self-help efforts have today been superseded by a definite country-wide community development program, CARE can lay claim to having helped set the goal as well as the course toward it. In 1960, on the request of the Colombian government and the National Coffeegrowers Association, CARE undertook a survey, to determine what chance of success existed for a collective effort to improve living conditions, and what material and social resources could be tapped for the job of rebuilding Colombian rural communities.

Implementation of the resulting programmatic proposals were made considerably more successful when CARE became the first private agency to which a Peace Corps contingent was assigned. Today, a Peace Corps force of over 200 is serving its two-year term in Colombia under the direct supervision of CARE personnel.

The best of building tools or agricultural implements would be of little value even in the most willing hands without proper knowledge of their use. And it can be stated without qualification that the Peace

Corps volunteers established a truly remarkable record in imparting to the Colombian people the technical know-how and skills for which, on the basis of their background and academic training, they were chosen for their assignment.

Spread in pairs over the Colombian countryside, the Peace Corps volunteers usually work in close cooperation with local "Acciones Comunitales" and district "Juntas" in which the villagers band themselves together for joint action in projects which none of them could ever hope to accomplish individually.

One member of the team may devote himself almost entirely to leading the local voluntary labor force in the building of schools and community centers, of roads and bridges, wells and water mains, aqueducts, sewers, bathhouses. Meanwhile his team mate, who as often as not is a trained agronomist, is kept busy showing the *campesinos* how to increase their crop yields with improved cultivation methods, more attention to fertilizing and pest control, or even by demonstrating the best norteamericano method of trimming the teeth of piglets.

Together the two Peace Corps volunteers may even find time to organize a Rural Youth Club on the pattern of our own 4-H Club, and to supervise the club's school garden and demonstration plantings, with clear understanding that the boys and girls will in turn pass on their newly found knowledge of more efficient farming to their elders.

From Ebejico in the Department of Antioquia comes the amusing story of a small-holding farmer who would not be convinced, either by the Peace Corps men or by visiting agricultural extension service agents, that his farming methods could be improved. But this Doubting Thomas had a son. When the youngster joined the local Youth Club, the doting father gave him a patch of land for his own, to try the new vegetable seeds and the new implements CARE had provided through the Peace Corps team. The boy proved to be not only an excellent truck gardener, but also a Number One businessman. Selling his produce in the open market, he managed to earn a greater net profit from his plot of half an acre than did his father from more than two acres. That convinced the old man that it was time to change his production methods.

If I seem to have dwelt for some length on Colombia, it was because there CARE was able to prove most conclusively what self-help aid can mean for a given country in its efforts to improve its health, education, and economy.

To varying degrees, the Colombian experience has been repeated in other countries of the Caribbean region, even though, with the single exception of Guatemala, we did not have the assistance of a specially

trained Peace Corps contingent, and our aid efforts may consequently not have reached the same impact in depth as they did in Colombia.

However, Guatemala in particular is a case in point for the manifold aspects of CARE self-help aid. Providing developing communities with the building materials and tools needed for the ambitious plans to erect hundreds of new schoolrooms every year, CARE won the active assistance of SCIDE, the Servicio Cooperativo Inter-Americano de Educación.

A definite do-it-yourself note was added with the development by CARE of a prefabricated desk-and-bench set which can easily be assembled even by an untrained villager with no more tools than a screwdriver. In their own school building programs, Honduras and Costa Rica now are also beginning to benefit from the introduction of these basic school furniture sets.

Whatever the significance of any of these various self-help projects may be, they all have a common starting point as well as a common goal in the need to increase the available food supply and with it individual well-being and public health. With the distribution of vegetable seeds to Rural Youth Clubs and community centers, CARE has introduced garden truck and a variety of foods formerly unknown in the Caribbean region.

In areas where the exhausted soil refused to bear any other crops, CARE managed to lay the foundations for new agricultural pursuits with the distribution of fruit saplings and a consequent enrichment of the diet of the surrounding countryside.

Panamanian fishermen today are bringing home larger catches and are making a most substantial contribution to the national diet after CARE equipped them with lumber and hardware for the building of new boats, and then added nets, rope yarn, and other fishing gear. Eventually, CARE also provided a number of outboard motors which now tow the whole fleet to formerly untapped fishing grounds further out to sea and bring the boats back home in a much shorter time.

Construction of an icehouse and the gift of a refrigerated truck were the next, and I believe, quite logical steps when the fishermen decided to form a cooperative association and eliminate the several middlemen who formerly manipulated and controlled the marketing of the catch.

The San Lorenzo Fishermen's Cooperative of Honduras had a very similar history and likewise was provided with a truck. British Honduran fishermen are currently being trained in operating the Diesel engines that will power their towing vessels.

When the need arises, CARE does not hesitate to add "heavy" equipment to self-help supplies. A caterpillar tractor and bulldozer was recently provided for the Costa Rica ITCO, the Institute of Land and Colonies,

for use in an ambitious road building program that is expected to open the remote Guanacaste region for settlement and cultivation.

Since this 15th Caribbean Conference was mainly devoted to the discussion of health problems, you will be interested to know that CARE by no means neglected "medical aid" as part of its self-help program. We have provided the equipment for a number of child welfare centers and public health dispensaries in various Caribbean countries.

A British Honduran blood bank received the full equipment for sterilization and plastic blood preparation. Orthopedic instruments and other equipment were supplied for a physical rehabilitation center in Honduras. In Guatemala, a score of villages on the shores of Lake Atitlán, inaccessible from the land side, are now being served for the first time by a floating clinic, powered by two reconditioned outboard motors supplied by CARE.

Earlier this year, CARE furnished the equipment for midwifery courses inaugurated jointly by WHO and the Dominican Ministry of Health for the Puerto Plata region. The Altigracia Maternity Hospital of Santo Domingo was supplied with \$6,000 worth of ward and operating room equipment. More significant even was medical aid for Haiti, which during the past year alone reached a total of \$52,000, ranging from drugs and hospital beds to special equipment for the Polio Center at Cap Haitien and the prosthetic workshop of the St. Vincent's Home.

But most important, no less than 25 of CARE's specially designed mobile health units are operating in five Caribbean countries today. Ranging in cost from \$6,000 to more than \$26,000, these units vary from a simple ambulance and first-aid dispensary to multipurpose "clinics-on-wheels," especially equipped for chest x-ray investigations or, as the case may be, for the diagnosis and treatment of typhoid, malaria, intestinal parasites, and other indigenous diseases.

Not only are these health units bringing medical care to vast areas which frequently have never known a physician before, but from a public health point of view it may be even more important that some of these units are equipped with a public address system and other audio-visual apparatus, permitting the accompanying doctor-nurse team to deliver illustrated lectures on health, sanitation, and personal hygiene.

V

All this manifold material aid, as I stressed earlier, is private in character. As a voluntary agency, CARE depends for its self-help assistance entirely on public contributions. During the past fiscal year, individual

American and Canadian citizens and civic and service organizations donated more than \$10 million to CARE and its various aid programs.

Some of these organizations, like the General Federation of Women's Clubs; fraternal orders like the Eagles; professional groups like the National Grange; and various denominational associations have either joined CARE as member agencies or are utilizing CARE procurement and delivery facilities in directing their own individual foreign aid programs to countries in which they are particularly interested.

The General Federation, for instance, has for years carried on a CARE aid program for nine Latin American countries which stressed education in its broadest sense, from general school supplies to vocational and literacy training equipment. Only last month, the American Legion Auxiliary originated the first three of more than a dozen rural schools that are being built under its "country program" with CARE tools and supplies in the Dominican Republic.

United States and Canadian Lions Clubs provided the saddle horses and mules, the implements and tools needed to equip the CARE supervised Peace Corps contingents in Colombia and Guatemala. In other Caribbean countries, local Lions Clubs are giving their support, supervision, and voluntary manpower in carrying out the CARE community improvement projects adopted by other Lions International affiliates.

Likewise, the American business community has begun to share with the general public the understanding for the necessity of private foreign aid. A recent two-year program, undertaken by the employees and agency personnel of a nationally known insurance company, was in many respects exemplary for the manner in which such truly effective aid can be brought to people striving to lift themselves out of the slump of poverty and despair by their own efforts.

On a strictly voluntary basis, these insurance company staff members raised among themselves the funds needed to build and equip schools in Guatemala. They provided four of the CARE mobile health units, two each for Costa Rica and Guatemala. With galvanized pipes and plumbing fixtures, they helped Honduran villagers to pipe clear, uncontaminated water for a distance of ten or more miles into their communities.

None of these self-help improvements could be possible, of course, without the voluntary labor of the people themselves. And it is precisely here that our foreign aid is assuredly making the deepest impact and holds the greatest promise for the future.

Once established, the habit of discussing improvements of fields and orchards and other community developments with their peers, of arriving at joint decisions, of taking part in the work involved, cannot fail

to create among even the most isolated *campesinos* the freedom of individual thought and concerted action which, when everything is said and done, forms the basis of democracy.

In this light, the economic progress and social reform engendered by our foreign aid are truly a grass-roots affair. The *campesinos* are learning how to practice democracy, at least on the local level. But the fundamental changes wrought by their own self-help efforts are focusing their eyes on the processes of government on a larger scale.

This constitutes a most important achievement in an area where so far few countries have thoroughgoing democratic régimes. If we have been able through our foreign aid—governmental and private—to pave the way in the Caribbean region for truly popular participation in government, we have built well for the future—theirs and ours. We can, I believe, be well satisfied with the result and its cost.

Part VII

BIBLIOGRAPHY AND REFERENCE SOURCES

**Janeiro B. Schmid: BIBLIOGRAPHY AND REFERENCE
SOURCES IN THE CARIBBEAN**

SINCE THE GENERAL THEME of this Conference is Health Problems in the Caribbean, I shall begin by quoting the World Health Organization definition of health as found in the preamble to its constitution: "Health is a state of complete physical, mental, and social well-being and not merely the absence of disease or infirmity." The constitution further states that the "extension to all peoples of the benefits of medical, psychological and related knowledge is essential to the fullest attainment of health." This concept of health is quite broad, and to implement it requires an understanding of the applicable socioeconomic culture as well as a knowledge of basic medicine. Today the scope of a physician's practice is interlocked with many phases of community life, and the doctor has become one of a team comprising many experts in related fields. With all due modesty, I must mention the medical librarian as a member of this team.

Today's broad concept of health and medicine is an evolutionary one and I hope you will be as intrigued as I have been by that part of its history dealing with the Caribbean from aboriginal times through the colonial period. The primitive peoples whom the early European explorers found in the Americas had all developed a knowledge of medicinal plants and methods of curing, and had their gods of healing. The writings of early historians of the New World have preserved descriptions of their rites and illustrations of their medical and surgical methods. It is also worth noting that, although no doctors were aboard the Mayflower, Columbus brought two physicians on his voyage in 1492. One of these, Maese Juan, remained with the first colonists when Colum-

bus returned to Spain. He was killed by natives during an attack against the settlement and thus became the first doctor to die at his post of duty in the New World. Shortly after his death, the first hospital in the Americas was opened in Santo Domingo in 1504. Others followed soon: one in Panama in 1520, in Mexico 1523-24, and in Guatemala in 1530. Another which was opened in Mexico in 1534 for yaws cases was probably the first isolation hospital in the New World.

The founding of these early hospitals bears witness to the medical needs of the colonists. Although each group of conquistadors was required to take at least one medical man with the expeditions, so many more were needed that a medical course was established at the University of Santo Domingo as early as 1538, and in Mexico in 1540. Mexico also had one of the first universities in America, and boasts the first chair of medicine (1580) as well as the first library and the first printing shop. Therefore it is only natural that the first medical books published in America bear the imprint of Mexico.

Among these early medical volumes, we might mention *Suma y recopilación de cirugía* (1579), written by the Spaniard Alphonso López de Hinojosa, and *Tratado breve de medicina* (1592), by Fray Agustín Farfán, a Mexican who was one of the first medical graduates from the University. The famous Badianus manuscript, written in Aztec in 1552 by the Indian Martín de la Cruz and partly translated into Latin by Juan Badiano, has been called the first American Pharmacopoeia.

It is generally assumed that, along with the establishment of medical schools and the coming of the printing press to the New World, there must have been collections of medical books and literature. However in the late eighteenth century we read of Lorenzo Campíns in Caracas dictating material from his notebook, and requiring his students to memorize their notes, so we know that medical libraries were rare. It seems that small collections were privately owned, were not systematically arranged or classified, and were not accessible to the general public, let alone to medical students.

Until comparatively recent time, the libraries for medical schools in Latin America have been for the most part reference collections, unavailable for use except by permission of the dean. Since books were not circulated, librarians were looked upon merely as custodians to keep the books in order. This was probably a major reason for the low status of librarians in Latin America as a social and economic group, and exerted a negative influence against the professional training of librarians. However, progress is now being made through library courses offered by schools in Mexico City, Caracas, and Antioquia, Colombia.

In more recent times, we also find that the Caribbean, like other areas of the world, has increased its output of scientific literature; but although it is considerable it has not been in the same ratio as elsewhere. Unfortunately, due to the high birth, marriage, and death rates of publications, it is impossible to give a definitive count of journals published in a country or area at any specific time. However, a recent estimate of biomedical journals in the Caribbean totaled 266 titles with a variation ranging from a single publication in three different countries to a high of 84 in another.

As a guide to sources for the study of health conditions in this area, a list of selected references has been compiled. This list will be printed as a part of this paper. Therefore I will not impose on your time by reading each entry, but will mention only a few. The first group is a listing of selected journals chosen as the most representative *currently* being issued, and no attempt was made to show the variation in titles. The second group consists of the reports of various Ministries. These are prepared annually, but are always difficult, and sometimes impossible, to get. Despite every attempt to obtain these reports the Library of the Pan American Sanitary Bureau does not have a complete collection. Their existence is a logical assumption; their acquisition is frustrating. Perhaps the next most important source is the group of statistical reports, followed by the budgets and reports of receipts and expenditures. The development of long-range planning for health is essential for programming, and most of the Caribbean countries have now published their five- or ten-year plans. These studies as guides for implementing the services are an important source of health information. Another class of source material is health legislation, and the fourth deals with general information.

The references just mentioned are those published in the Caribbean. There are, however, sources originating outside the area. Of these broader sources, some which deserve mention are publications of the Pan American Health Organization and the World Health Organization. These are listed in their respective printed catalogues: for instance, the WHO *Annual Epidemiological and Vital Statistics* and *Second Report of the World Health Situation*, and PAHO's *Health Conditions in the Americas*.

As an international health entity, the Pan American Health Organization has long had a vital interest in public health and its correlates; medical science, research, medical education, publications, libraries, and librarianship in the biomedical field. The library of the Organization, officially founded in 1926 by representatives of the Pan American Sani-

tary Bureau at the First Pan American Conference of National Directors of Health has served as the archives of the Bureau, and has a unique collection of Latin American journals and books in public health and related disciplines, which are, for the most part, received in exchange for the Bureau's monthly *Boletín*. This two-way travel of scientific information is good both for our needs and theirs. In addition to building up a collection of Latin American source material, and making it available to staff members of our organization at headquarters and in our zone offices, library staff members also supply bibliographic information and publications to individuals and libraries.

The Organization has established fellowships in medical librarianship at the Inter-American Library School in Antioquia, Colombia, where courses are given in Spanish. Visiting librarians from Latin America are always welcome to observe our procedures and techniques; and more than one such librarian has received in-training experience at our library.

In 1947 the Rockefeller Foundation gave a grant to the Medical Library Association to provide scholarships for foreign librarians to study medical librarianship in the United States. This grant, extended annually until 1963, was administered by the Association's Committee on International Relations. Among the Latin American scholarship recipients were two from the Caribbean, one each from Colombia and Cuba. Another scholar from Argentina is now working in Costa Rica.

A curriculum specializing in medical librarianship was not available anywhere in Latin America until the Inter-American Library School offered a course to train the librarians of the Colombian medical schools. The Pan American Health Organization has provided three fellowships to Latin Americans for training there, and a larger number of fellowships will be allocated next year.

Since our broad concept of health is interrelated to socioeconomic development as endorsed by the Alliance for Progress, and supported by the programs of the Pan American Health Organization, there is an increasing need for a corps of educated specialists in this field. This need can be met only by improving existing courses and designing new ones in the area's universities and medical schools. The standard of higher education depends largely on the performance of universities, and a university's worth is correlative with that of its library.

When I was invited to participate in this Conference, I was reluctant to do so since I have not yet had the opportunity to visit the libraries of the region. My only practical alternative to an on-the-scene study of their installations was a survey of Caribbean library facilities in the

biomedical field. The questionnaire would undertake to show types of libraries; sizes of staff and collections; salaries of staff members, categorized as professional or clerical; sizes of budgets in relation to overall budgets of parent organizations; average circulations; and numbers of hours of service per week. In July, 1964, the questionnaire was completed and mailed—in English or Spanish, as appropriate—to each of the biomedical libraries of the area. The list of libraries was compiled from directories published by the Pan American Union, the National Library of Medicine, and the Pan American Health Organization; and from the Medical Education Information Center directories of schools of medicine, public health, dentistry, and nursing. Of the 167 questionnaires sent out, only 28 were returned—a bare 16 per cent. Some replies were only fragmentary, but they showed, by default at least, some of the problems of biomedical libraries of the area.

Table 1 shows the number of libraries of the area, and those reporting. Table 2 shows the distribution of libraries according to size.

TABLE 1
BIOMEDICAL LIBRARIES IN THE CARIBBEAN

COUNTRY	LIBRARIES	REPLIES
Antigua	1	1
Canal Zone	1	1
Colombia	22	4
Costa Rica	6	1
Cuba	17	1
Dominica	1	1
Dominican Republic	5	0
Guatemala	9	5
Haiti	3	0
Honduras	4	1
Jamaica	1	1
Mexico	63	5
Nicaragua	7	1
Panama	3	1
Puerto Rico	4	1
St. Vincent	1	1
Trinidad and Tobago	1	0
Venezuela	18	3
Totals	167	28

Only a few librarians answered all questions concerning their library budget and its relation to the total budget of the parent organization. It was hoped that a percentage between the two budgets could be shown in tabulation, but there were not enough reports even to provide a pattern.

TABLE 2

SIZE OF LIBRARY COLLECTIONS

COUNTRY	NUMBER OF VOLUMES			
	Less than 10,000	10-20,000	20-30,000	30-40,000
Antigua	1			
Canal Zone		1		
Colombia	2	1		1
Costa Rica	1			
Cuba			1	
Dominica	1			
Guatemala	5			
Honduras	1			
Mexico	5			
Panama	1			
Puerto Rico				1
St. Vincent	1			
Venezuela	1	1	1	
Totals	19	3	2	2

For instance, one library reported one budget in U.S. dollars and the other budget in national currency! In fact there were so many variations and complications arising from inconsistencies in reporting that I soon became lost in a maze of pesos, bolívares, and quetzales.

Of the reporting libraries, thirteen have a professional librarian; that is, one who has completed courses in library science. The Canal Zone and Venezuela registered 100 per cent in this category, and Colombia and Mexico, 50 per cent. These averages, with the exception of the Canal Zone, coincide with the development of courses of library science. The school in each of these countries has made excellent progress in strengthening the professional training of librarians.

At this point I should like to mention several outstanding medical libraries in the Caribbean, selection having been made not on the basis of size of the collection, but on the quality of service to the organization it serves. Among these is the Library of the Instituto Venezolano de Investigaciones Científicas (IVIC) in Caracas, which is under the Ministry of Health and Social Assistance. Without any publication of its own to offer in exchange, the library nevertheless receives by subscription and gift about 1,200 current titles, and has approximately 16,000 bound volumes of journals and 6,700 books and monographs. Two trained professional librarians and eleven clerical assistants keep the library open for a total of 81 hours per week to provide regular reader services, and supply about 20,000 pages of photocopied material a year. Judging by photographs of the interior of this library, it appears that the building

and equipment are modern and excellent. The budget for salaries and acquisitions is good, but will need to be increased to keep pace with rising costs.

Another outstanding library is that of the Instituto de Nutrición de Centro América y Panamá (INCAP) in Guatemala City. The Pan American Health Organization has a member on the Board of Directors of INCAP, an autonomous institution; and the two international organizations have many mutual interests. The Library of INCAP is one of the most complete in Latin America in the field of nutrition and related disciplines. It has a collection of approximately 6,000 volumes, including books and bound journals. The size of the collection is being augmented by regular subscriptions and by exchange of publications, so that about 250 titles of current journals are now being received. There is also a large collection of reprints on nutrition. Incoming publications are promptly indexed, so that access to information is easy and quick. Through its Bibliographic and Documentation Service the library can make its material available to all member countries by means of photocopies. It also maintains a service of exchange of information with other areas of the world, where similar research is being carried on. The Children's Fund of Michigan and the W. K. Kellogg Foundation have both given generous support to the INCAP library. The chief of the Bibliographic and Documentation Service, Miss Raquel Flores, has acted as a strong catalytic force in librarianship in Latin America. She surveyed the library of the Instituto Nacional de Nutrición del Ecuador (INNE) and made recommendations for its improvement. She has also served as professor of two courses in medical librarianship at the Inter-American Library School in Antioquia. Thus, her influence reaches out far beyond the walls of her own library.

Two libraries in Colombia merit special attention. One of the older libraries is that of the Facultad de Medicina of the Universidad de Antioquia, which dates back to 1872, the year following the founding of the medical faculty. It has a collection of 13,000 volumes, and receives a total of 800 periodical titles. There is a professional librarian, who plans and carries out the reader services for approximately 28,000 users per year. The W. K. Kellogg Foundation has been generous in supporting the library financially.

One of the newest libraries in Colombia which has a high rating is the medical library of the Facultad de Medicina of the Universidad del Valle, at Cali, which serves a total of about 650 students and over 200 faculty members. The collection consists of 8,500 volumes and 9,100 volumes of bound journals. There are 1,150 titles of periodicals, making

a total collection of about 39,000 volumes. The monthly circulation averages 1,100 items, and interlibrary loans are common. The library is open for services 86 hours per week. The Rockefeller Foundation has been most generous in financial support of this library.

I would also like to mention the Centro de Investigación y de Estudios Avanzados, the former Centro de Documentación Científica y Técnica in Mexico City, which in 1952 started publication of its monthly *Boletín* under the aegis of UNESCO. In 1956 the *Boletín* was issued in various sections, according to subject matter. Then in 1962 the Centro became a part of the Instituto Politécnico Nacional de México, and added "de México" to its name. In its *Indice Bibliográfico*, also issued in sections, it publishes recent summaries from selected national and foreign journals. Its library is open for use to any reader or student, and prepares lists of references upon request, short ones being supplied free. Microfilms and Xerox copies are available at a minimal charge, prices being listed in the *Indice Bibliográfico*.

I am sure you will all agree with me from the brief description of libraries I have just given that biomedical librarianship is making great strides in the Caribbean and showing an upward swing that I hope will match, if not surpass, progress in other fields of public welfare which are our common interest.

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